7. *The Pristerognathid Therocephalians from the* Tapinocephalus-*zone in the South African Museum.* By L. D. BOONSTRA, D.SC.

(With 22 text-figures)

IN the course of my study of the fauna of the TAPINOCEPHALUS-zone the collection of Therocephalians in the collection of the South African Museum has grown to number nearly a hundred specimens. The majority belong to the family Pristerognathidae. Unfortunately, well preserved specimens are rare and, although we have some good skulls, most of the specimens are weathered snouts and in only a few cases have we postcranial elements associated with the cranial material. In this paper I propose to deal only with the cranial material.

The Pristerognathids represent the bulk of the small to fairly large carnivores in the fauna of the *Tapinocephalus-zone.* With them occur members of some other Therocephalian families viz. Lycosuchidae and Scylacosauridae and as a lesser element some Scaloposauridae, which were probably insectivorous. The balance of the carnivorous section in the fauna is formed by a few small Gorgonopsians and then we have the large and massive Titanosuchid Deinocephalians.

The food source of these carnivores consisted mainly of the number of small herbivorous Dicynodonts and the abundant large Pareiasaurs and Tapinocephalid Deinocephalians. Some of the Pristerognathids were probably carrion eaters.

Family Pristerognathidae

DIAGNOSIS

Fairly small to large early carnivorous Therocephalians from the *Tapinocephalus-zone* with a dental formula varying within the limits, $\mathrm{i.}\frac{5-6}{3}$, $\mathrm{c.}\frac{1}{1}$, $\mathrm{p.c.}\frac{2-9}{2-9}$. The incisors and canines usually well developed and the post-canines, with few exceptions, relatively feebly developed. Skull long, fairly high and narrow; snout long, fairly narrow; sagittal crest high and sharp; temporal fossa moderately long and broad; low to fairly low over post-orbital arches; lower jaw strong, dentigerous ramus of dentary not curved and relatively long, post-dentary part of mandible strong, strong coronoid process. Prefrontal and postorbital well developed; and postfrontal well to fairly well developed; jugal arch moderate to strong; frontal with moderate entry into orbital border or excluded from it; septomaxilla with well developed facial surface; pineal foramen medium to fairly large; parietal narrow with sharp crest; paroccipital strong; occiput fairly high and broad, deeply concave; epipterygoid narrow; anterior palatal openings medium to long; suborbital vacuities large; palate flat; with only the anterior ramus of the pterygoid bearing teeth; basisphenoidal tubera of medium size, parasphenoidal keel deep; suspensorium posteriorly situated high up and only moderately laterally displaced.

Within the family two groups can be recognised which may yet have to be considered as subfamilies:

a. Those with 6 incisors and with skulls where the length is double or more the breadth.

b. Those with 5 incisors or with an inconstant 6th and where the skull length is less than double the breadth.

GENERAL DESCRIPTION

Incisors, canines and post-canines have a sharp posterior cutting edge which is serrated — the serrations vary from fine to fairly coarse. The incisors are moderately curved teeth with a more or less flattened extremity forming a curved cutting edge. They vary from fairly weak to very strong seizing and tearing teeth. The first incisor with its fellow form a pair of teeth closely set to each other, with the root rounded in cross section and always smaller than the second incisor. The second to the 5th incisor are subequal or decrease in size backwards. In the forms with six incisors the 6th tooth is inconstant in some genera and in the others it is mostly much smaller and weaker than its predecessors. There is always only one canine; except in one genus the canine is always a strong curved dog-tooth with its extremity more pointed than is the case in the incisors; the upper canine is situated far forward in the maxilla (except in one species) and to house its long strong root the maxillary edge has grown downwards so that the premaxillary edge is situated at a higher level; usually the alveolar border curves evenly upwards anterior to the canine, but in some the transition is by a distinct step. The diastema between last incisor and canine varies considerably in length — sometimes the canine follows immediately after the last incisor. Behind the canine the diastema to the first postcanine also varies considerably, but only in one specimen does the first postcanine lie right up against the canine.

The number of postcanines varies considerably in the Pristerognathids — from 2 to 9. The postcanines of the family, considered as a group, must be described as weakly developed. They are usually small slightly curved teeth either closely set or well spaced. In only one genus *(Cynariognathus)* do they form a set of well developed teeth. They are often irregular and of little functional importance.

In the dentary there are apparently always 3 incisors, which in the closed jaws are overlapped by the upper incisors. The lower canine lies lingually and anteriorly to the upper canine and its point in the closed jaws is housed in the anterior section of the "choanae". Little is known of the postcanines of the dentary — they lie lingually to those of the maxilla.

It is thus evident that the Pristerognathids in their feeding relied on the anterior part of the jaws; the large canine acting as piercing instrument to effect the kill and these together with the incisors were used to hold the victim and then acted as the instruments for tearing away pieces of flesh. Those with weaker incisors were probably carrion eaters. In most Pristerognathids the postcanines acted chiefly as protruding points preventing flesh from slipping out of the mouth. The transverse pterygoidal rami limited the action of the lower jaw to movement in a vertical plane and there was thus no chewing or cutting by the postcanines. The small set of recurved teeth on the pterygoidal ridge served to hold the flesh in the stage preliminary to deglutition.

The postfrontal is well developed in some species, whereas in others it is only a fairly small splintlike bone; it has only a small posterior extent, in some forms extending up to the plane of the fronto-parietal suture, in others a little further and at most to the level of the pineal foramen. It seldom extends further posteriorly than the postorbital. The posterior tongue is usually confined to the dorsal surface but sometimes lies on the lateral face of the parietal crest.

The postorbital varies in the extent of its participation in the postorbital bar, which is slender to fairly slender, never widened; in some forms it has a small entry into the orbital border and the temporal border; in others the entry into the orbital border is small, but the entry into the temporal border is large; this depends on how high the dorsal jugal ramus extends and to what extent the jugal is confined to the posterior half of the postorbital bar. A postero-dorsal tongue of the postorbital sometimes just enters the supratemporal border where it is applied to the lateral face of the parietal or it sometimes develops quite a fair-sized sheet of bone flanking the parietal, but seldom extends to just behind the plane of the pineal foramen.

The jugal is always well developed; it is triradiate with a dorsal, anterior and posterior ramus. The anterior ramus forms the lower part of the orbital border and a varying portion of the lower part of the posterior orbital border; it mostly forms a sharp pointed wedge in between the lacrimal and maxilla, but this is sometimes truncated. The dorsal ramus sometimes forms the whole posterior half of the postorbital bar and thus this part of the temporal border; in other forms its dorsal extent is much smaller and this part of the temporal border is formed by the postorbital. The posterior ramus always extends very far posteriorly as a long pointed wedge underlying the anterior ramus of the squamosal, together forming the temporal arch. Usually the jugal forms nothing or very little of the upper border of the temporal arch, but in those forms where the anterior ramus of the squamosal is short it forms the anterior portion of the upper border of the temporal arch. (This long posterior ramus of the jugal in the Pristerognathids resembles the condition seen in Cynodonts much more than does the jugal of the Gorgonopsians.)

The squamosal is always well developed; it has an anterior ramus extending far anteriorly to form most of the upper border of the lower temporal arch where it overlies the jugal; its ventral ramus extends far ventrally, laterally largely covering the quadratojugal and posteriorly covering most of the posterior face of the quadrate, which is housed in a recess in the antero-ventral face of the descending ramus of the squamosal; the medially directed ramus of the squamosal forms the posterior border of the temporal fossa and is here applied to the outer face of the parietal; this overlap of the squamosal on the parietal is fairly small so that the postorbital and squamosal only flank the lateral face of the parietal in its extreme anterior and posterior part respectively, leaving the parietal to form nearly all of the upper border of the temporal fossa. Where the squamosal meets the strong paroccipital the edge of the squamosal is everted to form the auditory groove. The sweep of the squamosal posteriorly carries the posterior border of the temporal arch far back in the long narrow headed forms and thus forms a deeply concave occiput, whereas in the shorter broader-headed forms there is only a moderate backward sweep with a shallowly concave occiput. There is only a moderate lateral sweep of the squamosal so that the temporal fossa never becomes very wide. There is more lateral sweep in those forms where the posterior sweep is least.

In dorsal view the Pristerognathids show little more of the upper occipital bones than their dorsal edges; the occiput is thus upright. In many forms the condyle is clearly visible in dorsal view, but in the longheaded forms it is either just visible or just hidden by the backward sweep of the parietals.

The quadratic condyles lie well below the level of the occipital condyle and in a plane well below that of the alveolar border of the maxilla; they have migrated very little in lateral direction so that the outer edge of the quadrate ramus of the pterygoid is fairly straight; there has also been no forward migration and they still occupy a posterior position.

The quadratojugal is much reduced and is a small element not entering the condylar surface but resting with its base on the ledge of the quadrate above the outer part of the condyle and with two weak dorsal processes fitting into recesses in the overlapping squamosal.

The large prefrontal has a rounded ridge separating a dorsal from a lateral face, but farther anteriorly the snout is rounded with no abrupt transition from dorsal to lateral surface.

The lacrimal is small and has little anterior extension due to the upward growth of the maxilla; it lies in the preorbital depression which is usually fairly shallow and extending as a shallow groove in the direction of the canines; but in some forms this depression is deep with sharp margins and anteriorly ends abruptly. The homology of the gland occupying the preorbital depression is uncertain.

The long and strong root of the canine is housed in a strong rounded bulge of the maxilla, which is consequently a high bone. The outer surface of the maxillary bulge often has an ornamentation of sub-crocodilian pitting, but in some forms it appears to be fairly smooth. It is pierced by a number of nutritive foramina.

The nasals are long and fairly narrow; together they are hourglass-shaped; the constricted waist being due to the upward growth of the maxilla overlapping the lateral edge.

In the lower jaw the symphysis is always weak and unankylosed, with the splenial just entering the symphysis and forming a very subordinate part and not visible ventrally. The angular has a large outer face with a notch and a reflected lamina.

Systematic Descriptions

Genus *Scymnosaurus* Broom.

Broom, 1903, p. 152. Genotype, *S. ferox* Broom.

Large Pristerognathids with dental formula i.5, c.1, p.c.2-4; incisors and canines large and strong, postcanines fairly weak to medium, varying in number — 2, 3 or 4. (In one specimen a small 6th incisor has been seen, but only on the one side.)

Skull very large (Max. Length 375 to 475 mm.); preorbital hollow fairly shallow, not sharply demarcated and really not more than a groove stretching from the orbit in the direction of the canine; septomaxilla and septomaxillary foramen well developed; frontal either excluded or possibly just entering the supraorbital border; snout probably always slightly broader than high, slightly narrowed between orbits and canines; orbits partly in anterior half of skull. Mandibular symphysis, formed solely by dentaries, weak, unankylosed, mentum sloping little or moderately.

Scymnosaurus ferox Broom. (Figs. I, IIa.)

Broom, 1903, p. 152. Holotype. S.A.M. 632. Locality unknown. Coll. unknown. A well preserved but imperfect snout.

There are 3 to 4 postcanines; mentum moderately sloping and symphysis weak; maximum length of skull 375 to 381 mm. (as reconstructed); frontal possibly still entering orbital border.

S.A.M. 632 (Fig. 1*a*).

Broom's holotype consists of the anterior third of the mandibular ramus, the dentigerous border of the premaxillaries and the maxillaries up to just behind the 3rd postcanine on the right and the 2nd postcanine on the left side. The horizontal fracture through the snout shows the dorsal surface of the anterior third of the palate, which is as figured by Broom (1903, Pl. 18, fig. 9).

The first four incisors are strong, whereas the 5th is much shorter and this tooth shows fine serrations on its sharp posterior edge; the robust canine has fine serrations on its sharp posterior edge; only 3 postcanines are preserved and these decrease rapidly in size in posterior direction; the postcanines bear coarser serrations on the posterior edge.

Referred Specimens

S.A.M. 3430 (Fig. 1*b*). Janwillemsfontein, Prince Albert. Coll. Haughton & Whaits.

This is an imperfect snout in which is preserved the symphysis and the major part of the premaxillaries and maxillaries. In both premaxillaries 5 incisors are preserved and here the 5th is only slightly shorter than the anterior 4 incisors. But on the left side there is a stump of what appears to be a small 6th incisor. On the right side a stump of the canine is preserved, as also stumps of the 2nd and 4th postcanines and empty alveoli of the 1st and 3rd. On the left side the canine has dropped out and so has the 1st postcanine, but stumps of the 2nd and 3rd are preserved.

The maxilla overlaps the premaxilla right up to the level of the anterior edge of

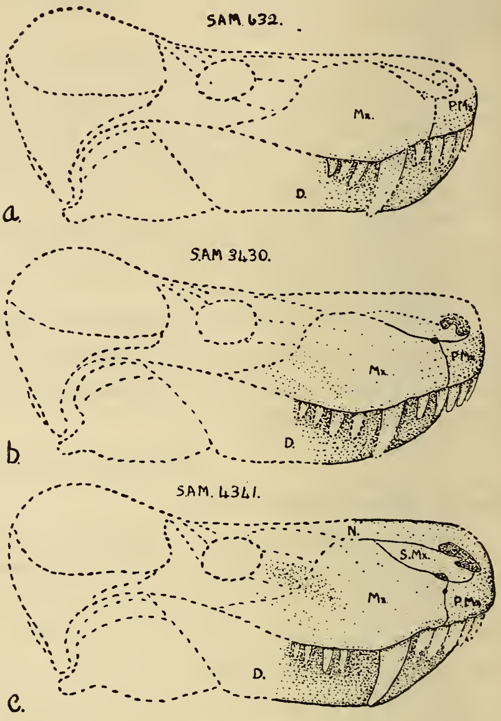

Fig. 1.—*a*, *Scymnosaurus ferox*. Type. S.A.M. 632. (× $\frac{1}{6}$.) Right side of snout fragment. *b*, *Scymnosaurus ferox*. S.A.M. 3430. (× $\frac{1}{6}$.) Right side of snout fragment. *c*, *Scymnosaurus ferox*. S.A.M. 4341. (× $\frac{1}{6}$.) Right side of snout.

Lettering of Figures:
A.—angular; Art.—articular; B.O..—basioccipital; B.S.—basisphenoid; D.—dentary; Ep. Pt.—epipterygoid; Ex.—exoccipital; F.—frontal; F.J.—foramen jugale; F.O. fenestra ovalis; I.P.—interparietal (postparietal); J.—jugal; L.—lacrimal; Mx.—maxilla; N.—nasal; P.—parietal; Pal.—palatine; P.F.—prefrontal; P.Mx.—premaxilla; P.O.—postorbital; P.Oc.—paroccipital; Po.F.—postfrontal; Pr.Ot.—proötic; P.S.—parasphenoid; Pt.—pterygoid; P.V.—prevomer Q.—quadrate; Q.J.—quadratojugal; S.A.—surangular; S.Mx.—septomaxilla; S.Oc.—supraoccipital; Sq.—squamosal; St.—stapes; Tab.—tabular; Tr.—transversum.
The figures are orthoprojections taken with a pantograph and, except where specifically stated, they are of the specimens as preserved without correction of any distortion. Reconstructed parts and uncertain features are shown in broken line. All figures drawn by the author.

the 4th incisor. The bulge of the maxilla above the canine is rugosely pitted, but no nutritive foramina can be seen. The septomaxillary foramen is of moderate size (6 mm.).

S.A.M. 4341 (Fig. 1*c*). Stinkfontein, Prince Albert. Coll. Haughton.

This is a weathered snout bleached white. Each premaxilla has the stumps of 5 incisors preserved; in cross section the 5th is only slightly smaller than the 4th; in the right maxilla imperfect crowns of 4 postcanines are preserved; the 3rd and 4th are the smallest and the 2nd the largest maxillary tooth.

The septomaxilla has a large facial exposure and a stout spur directed anteriorly into the nostril. There is a fairly large oval septomaxillary foramen and in the maxillary edge, greatly overlapping the premaxilla, there is a nutritive foramen. The maxillary bulge is rugosely sculptured. The nasals broaden as they approach the nostril.

S.A.M. 9084 (Fig. 2*a*). Rietkuil, Beaufort West. Coll. Boonstra.

This specimen consists of the major part of a distorted skull, lacking the intertemporal region, together with the ends of a humerus, radius and ulna. The articulatory region has recently been described and figured (Boonstra, 1953, fig. 1).

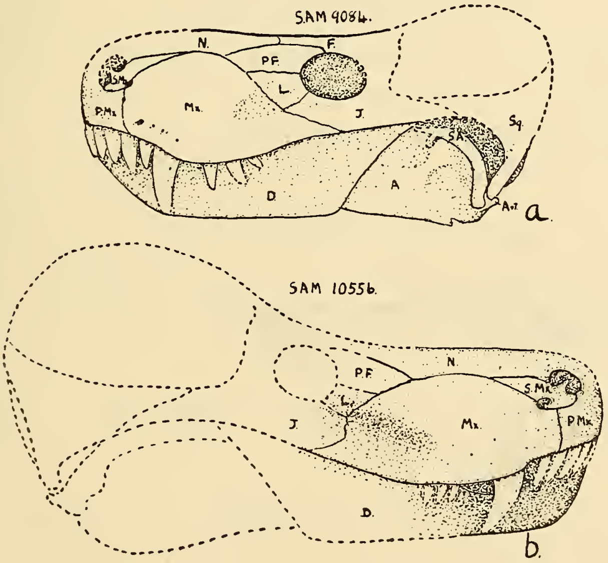

FIG. 2.—*a*, *Scymnosaurus ferox*. S.A.M. 9084. ($\times \frac{1}{6}$.) Left side of skull and lower jaw with correction of the distortion. *b*, *Scymnosaurus major*. S.A.M. 10556. ($\times \frac{1}{6}$.) Right side of preorbital part of skull.

With the full length of the lower jaw preserved it is possible to estimate the maximum length of the *Scymnosaurus ferox* skull viz. 375 mm. The incisors are large and robust with the 5th only slightly smaller than its predecessor and the sharp posterior edge bears moderately fine serrations. The 3 postcanines are short stout teeth with the 3rd much smaller than the anterior ones and the serrations on the posterior edge are as in the incisors and the canine. The 5th incisor lies close to the canine, whereas in the specimens mentioned above there is an appreciable diastema.

The preorbital depression has clearly demarcated borders.

The maxillary bulge is pitted and is perforated by a number of nutritive foramina. The septomaxillary foramen is fairly large (6 mm.) and the septomaxilla well developed but with less facial exposure than in S.A.M. 4341.

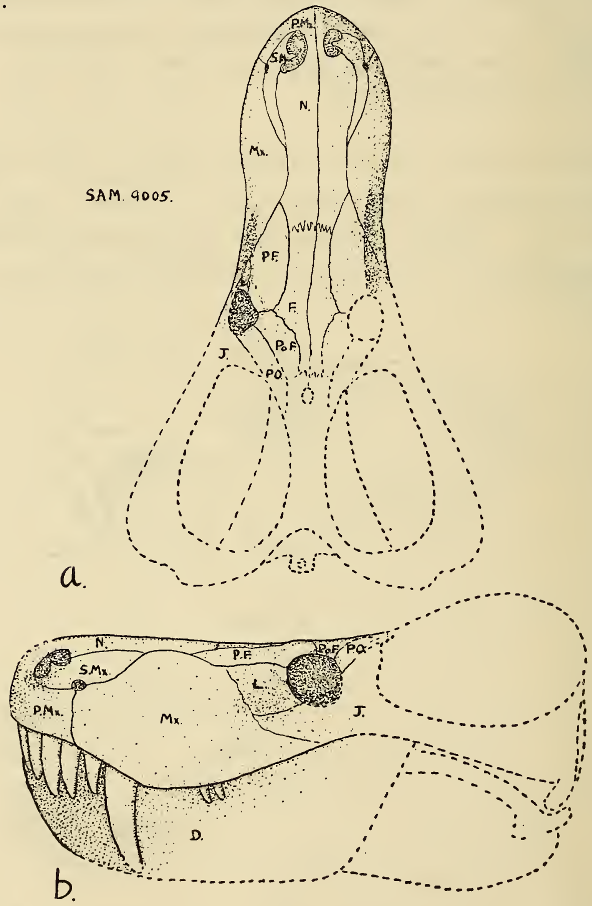

Fig. 3. *Scymnosaurus major*. Type. S.A.M. 9005. (× $\frac{1}{6}$.) *a*, Dorsal view. *b*, Left side.

The orbit lies partly in the anterior half of the skull.

The dentary is strong, with a straight ventral edge, a sloping mentum and a weak symphysis.

S.A.M. 4341.

Scymnosaurus major. Sp. Nov.

Holotype. S.A.M. 9005. Klein-Koedoeskop, Beaufort West. Coll. Boonstra.

The well preserved anterior two thirds of a skull together with parts of the pectoral and pelvic girdles, ends of humerus and radius and ulna.

There are 2 to 3 postcanines; mentum fairly upright and symphysis fairly strong; maximum length of skull 450 to 474 mm. (as reconstructed); frontal excluded from orbital border.

S.A.M. 9005 (Fig. 3 *a* and *b*).

The estimated maximum length of the skull is 450 mm. The incisors are large and strong (length of 3rd incisor 55 mm.); the length of the canine is 80 mm. (as reconstructed), whereas the two postcanines are small (15 mm.). All the teeth have a finely serrated sharp posterior edge. The 5th incisor lies close up to the canine, but the distance between the canine and the first postcanine is large (30 mm. on the right side and 50 mm. on the left).

The preorbital depression is deep but with rounded margins.

The maxillary bulge has pronounced pits and radiating grooves. The septomaxilla is well developed and the foramen fairly large (11 mm.). The maxilla is high but short.

The nasals widen considerably in their anterior half.

The frontals are small, very narrow and well removed from the orbital border. The prefrontals are large and the postfrontals fairly large.

The orbits are small and round (45 mm.) and lie partly in the anterior half of the skull.

The mentum is fairly upright but the two rami are loosely joined at the symphysis.

S.A.M. 10556 (Fig. 2*b*). Knoffelfontein, Beaufort West. Coll Boonstra.

This specimen consists of a weathered and bleached preorbital part of a large skull (474 mm. as reconstructed). Only cross sections of the roots of the teeth are preserved. The five incisors are practically of equal size.

Anterior to the canine there is a distinct diastema and the edge of the maxilla curves sharply downwards (the "step" of Watson). Posterior to the canine there is a diastema of 27 mm., then follow three closely packed small postcanines.

The preorbital depression forms an oblique groove from the orbit in the direction of the canine.

The maxillary bulge is strongly pitted. The septomaxilla is well developed with a strong intra-nostril spine. The septomaxillary foramen is very large (19 mm.) and is kidney shaped with a spur from the septomaxilla dividing it into two, in very much the same way as the medially directed spine divides the nostril.

The maxilla is low and fairly long.

The mentum is upright and the symphysis quite strong.

SCYMNOSAURUS sp. INCERTAE SEDIS

The following fragmentary specimens can be referred to the genus but specific determination is uncertain.

S.A.M. 8999. Locality unknown. Coll. unknown. A weathered snout fractured cleanly just behind the canines and from which little more can be determined than that there were 5 large subequal incisors and a fairly strong canine.

S.A.M. 11459. Buffelsvlei, Beaufort West. Coll. Boonstra and Marais. A weathered snout in pieces, with the dental formula i.5, c.1., p.c.3+? together with parts of a carpus and tarsus.

S.A.M. 11833. Lammerkraal, Prince Albert. Coll. Boonstra and Pienaar. A weathered snout with 1 postcanine on the right side and 2 on the left.

S.A.M. 11961. Dikbome, Laingsburg. Coll. Boonstra. A weathered snout with dental formula i.5, c.1, p.c.1+?.

S.A.M. 9126. Voëlfontein, Prince Albert. Coll. Boonstra. This consists of a fairly well preserved snout with the teeth of the left side preserved i.5, c.1, p.c.3+. The teeth are very similar to those of the genotype. Being only $\frac{2}{3}$ the size of the genotype this snout may represent a small species of *Scymnosaurus*.

Genus *Scymnosaurus:* Measurements in Mms.

		S. ferox.				*S. major.*	
		632	3430	4341	9084	9005	10556
Pr.Mx. — Post.Sq. edge		375?	375?	381	375	456?	474?
Pr.Mx. — Ant.Orb. border		—	—	—	187	215	216?
Width of Snout over Canines		105?	106	105	100?	115	100
Width Interorbital		—	—	—	60?	72?	—
Height of Snout at Post. edge of Canine		90?	96?	105?	100?	110	90
Length of Upper Incisor Series	l.	65	75	65	70	85	60
	r.	60	70	60	70	75	60
Diastema C.—I.	l.	9	—	15	3	6	18
	r.	7	11	16	5	9	16
Diastema C.—P.C.	l.	14	—	—	20	51	—
	r.	14	—	24	20	27	25
Length of P.C. Series	l.	—	—	—	42	18	—
	r.	30	—	41	36	21	30
Ant.-Post.Diam. of Canine	l.	22	—	25	24	31	25
	r.	22	20	20	—	26	25

Genus *Glanosuchus* Broom.

Broom, 1904, p. 85. *Genotype G. macrops* Broom.

Large Pristerognathids with dental formula i.5+1, c.1, p.c.5; the first 5 incisors are large but the 6th is inconstant and when present very small; the canine is large and strong; the postcanines are moderately to weakly developed.

Skull large (Max. length 315-321 mm.); preorbital hollow fairly shallow, not sharply demarcated and really not more than a groove stretching from the orbit in the direction of the canine; septomaxilla and septomaxillary foramen well developed; frontal enters orbital border; postfrontal quite well developed; snout broader than high, slightly narrowed between orbit and canines; orbits well in posterior half of skull.

Mandibular symphysis formed solely by dentaries, weak, unankylosed, mentum sloping.

Epipterygoid only slightly widened. Sagittal crest of parietals only moderately high but fairly sharp.

Glanosuchus macrops Broom. (Figs. 4 and 5.)

Broom, 1904, p. 85. Holotype. S.A.M. 637. Knofloksfontein, Beaufort West. Coll. Snyman.

A well preserved skull lacking only the posterolateral corners of the skull and thus the suspensorial region.

Broom's description was based on the only partially cleaned skull. I have cleaned up the outer surface, thus revealing the sutures and prepared the palate and basicranium so that these features can now be described.

In Fig. 4 *a, b* and *c* the structural features of the lateral and dorsal surfaces are shown. The septomaxilla has a large facial exposure, the spur projecting into the nostril is well developed and the foramen fairly large (6 mm.). The maxilla is fairly high and long with its dentigerous border curving upwards anterior to the posterior edge of the canine. The preorbital hollow has a fairly definite dorsal and posterior rim but anteriorly it flows into the general maxillary surface in the direction of the canine. The maxillary bulge above the canine is fairly smooth. The nasals are widest anteriorly. The frontal is of medium size apparently just entering the orbital border. In dorsal view the occiput is seen to be deeply concave. In outline the epipterygoid is hourglass-shaped and although not much widened it is not a columnar *columella cranii*. Its base, resting on the quadrate ramus of the pterygoid, has no great posterior process. Although the edge of the sagittal crest is not preserved it is clear that the crest was not very high and moderately sharp. The temporal fossa is short but roomy.

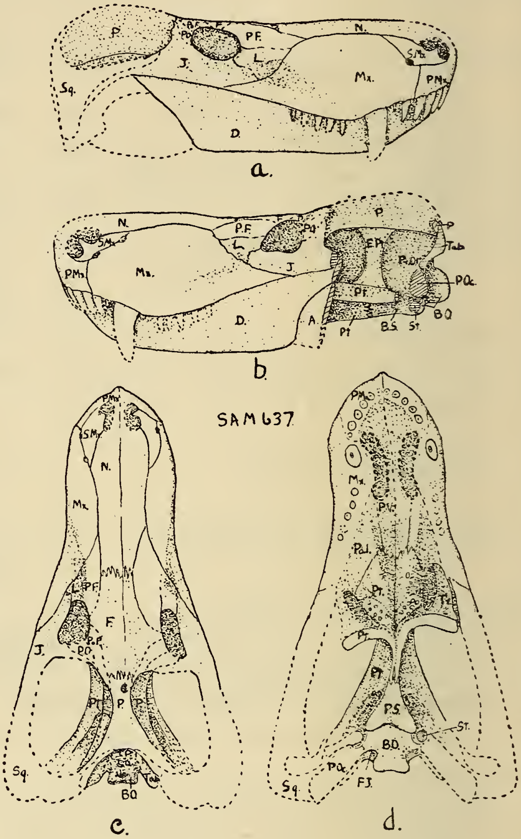

FIG. 4.—*Glanosuchus macrops*. Type. S.A.M. 637. (× $\frac{1}{6}$.) *a*, Right side. *b*, Left side. *c*, Dorsal view. *d*, Ventral view.

The ventral surface (Fig. 4*d*). With the dentaries in occlusion it has not been possible to expose the choanal region. The prevomers posteriorly form a truncated spatulate sheet of bone underlying the median edges of the palatine and the anterior edge of the anterior pterygoidal ramus. The lateral edge of the prevomer lies medial to an oblique ridge on the palatine. This ridge is continued on the pterygoid where it is dentigerous (a cross section of at least one tooth is clearly visible). The palatine is a relatively small bone, anteriorly bounding the choana and posteriorly forming the front margin of the oval shaped large suborbital vacuity. Two oblique sutures, meeting in an obtuse angle, separate the palatine from the prevomer and pterygoid. The pterygoid is a typically tetraradiate bone; the anterior ramus with its fellow, forms the lozenge-shaped middle part of the palate; anteriorly, between the two diverging dentigerous ridges, a V shaped hollow extends on to the prevomerine surface where it shallows and fades out; laterally the anterior ramus forms the inner border of the suborbital vacuity; the posterior part of the anterior ramus carries a prominent oblique ridge stretching from near the median line to near the edge of the suborbital vacuity; this ridge is dentigerous, carrying small sharp teeth irregularly arranged in two rows; in the median line just posterior to these dentigerous ridges there appears to be a small interpterygoidal slit.

The transverse pterygoidal ramus forms a strong bar which laterally descends to the level of the lower dentary border and this distal end lies just median to the angle of the dentary. The movement of the lower jaw is thus guided and confined with little lateral play allowed. Against the lateral part of the anterior face of the transverse pterygoidal bar lies the transversum; from here the transversum ascends rapidly and curving forwards as a thin process forms the lateral edge of the suborbital vacuity and meets the palatine.

The posterior ramus of the pterygoid with its fellow forms a median keel which clasps the anterior end of the parasphenoidal rostrum.

The quadrate ramus of the pterygoid is not completely preserved and one does thus not know whether it met the quadrate or not. On its upper surface the quadrate ramus carries the base of the epipterygoid. I have not been able to determine whether the epipterygoid has a posteriorly directed process running along the quadrate ramus. In ventral view it is seen that the edge of the quadrate ramus is only slightly concave and the epipterygoid has a roomy *cavum epiptericum* median to it and the anterior part of the proötic.

The parasphenoid is in ventral view seen as a sheet of bone underlying the basisphenoidal tubera and narrowing anteriorly is clasped by the pterygoids where these bones form a fairly deep median keel.

Ventrally the occipital condyle is formed by the strong basioccipital. Postero-laterally to the basisphenoidal tuber lies the *fenestra ovalis* with the proximal end of the stapes *in situ* on both sides. The rim of the fenestra is formed postero-laterally by the opisthotic, postero-medially by the basioccipital, antero-medially by the basisphenoid and antero-dorsally by the proötic.

Only part of the occiput is preserved; above the foramen magnum the occiput is deeply excavated; the posttemporal fenestrae are large; the paroccipital (opisthotic) strong and only the dorsal edge of the interparietal and tabular seen on the dorsal surface.

S.A.M. 11843. (Fig. 5*a* and *b*.) Lammerkraal, Prince Albert. Coll. Boonstra.

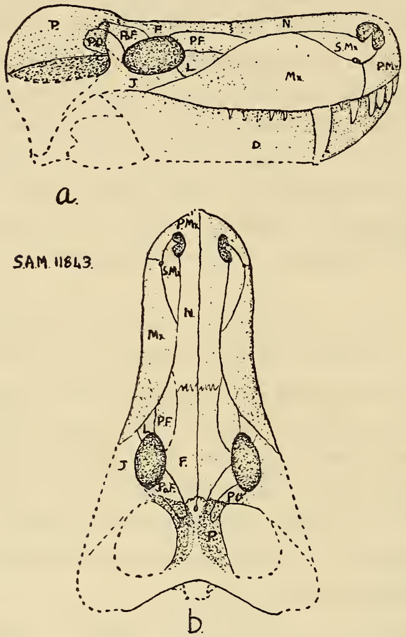

FIG. 5.—*Glanosuchus macrops*. S.A.M. 11843. (× $\frac{1}{6}$.) *a*, Lateral view. *b*, Dorsal view. Left side incorporating features determined of the right side.

This good specimen consists of the major part of a skull lacking only the suspensorial region and the lower edge of the dentary. It is complementary to the holotype skull in that it shows that the frontal has a small entry into the orbital border, the postfrontal and postorbital flank the parietal for a short distance within the temporal fossa; the sagittal crest of the parietals is preserved as a not very high but fairly sharp crista; the temporal fossa is short but roomy. But the postcanines are smaller and more slender although in both skulls they occupy the same space (48 mm.). The 6th incisor is preserved on the right side and here also it is very much smaller than the anterior incisors. As in the type all the teeth have a finely serrated posterior border. The occiput is less deeply concave than in the type skull. The preorbital depressien is very shallow and the maxillary surface smooth over the bulge where the long canine root is housed.

S.A.M. 11964. Locality unknown. Coll. unknown.

This is a weathered snout showing the upper dentition to be i.5+1, c.1, p.c.2+?, with the 6th incisor very small as in the two foregoing specimens. Although appreciably smaller than the type the dentition agrees well with that of the type so that I am referring it to the species *macrops*.

S.A.M. 903. Seekoeigat, Prince Albert. Coll. Du Plessis.

A very much weathered snout, which on account of the presence of a small 6th incisor can be included in the genus *Glanosuchus*.

Genus *Ptomalestes*. Gen. Nov.

Fairly large Pristerognathids with the dental formula i.5, c.1, p.c.6; the incisors are subequal and fairly weak, the canine strong and the postcanines small slender teeth well spaced.

Skull fairly large (Max. Length 258 mm.); preorbital depression fairly deep but without abrupt margins and shallowing in the direction of the canine; frontal just entering orbital border; postfrontal quite well developed; snout broader than high, only slightly narrowed between orbit and canine; orbits well in posterior half of skull.

Mandibular symphysis formed solely by dentaries, weak, unankylosed, mentum sloping.

Sagittal crest of parietals only moderately high and narrow.

Ptomalestes avidus Sp. Nov. (Fig. 6*a*—*d*.)

Genotype. S.A.M. 11942. Steenboksfontein, Laingsburg. Coll. Boonstra.

A fairly well preserved skull, but it has been subjected to a slight shear and some weathering, together with some cervical vertebrae, part of the pectoral girdle, humeri, radii and ulnae.

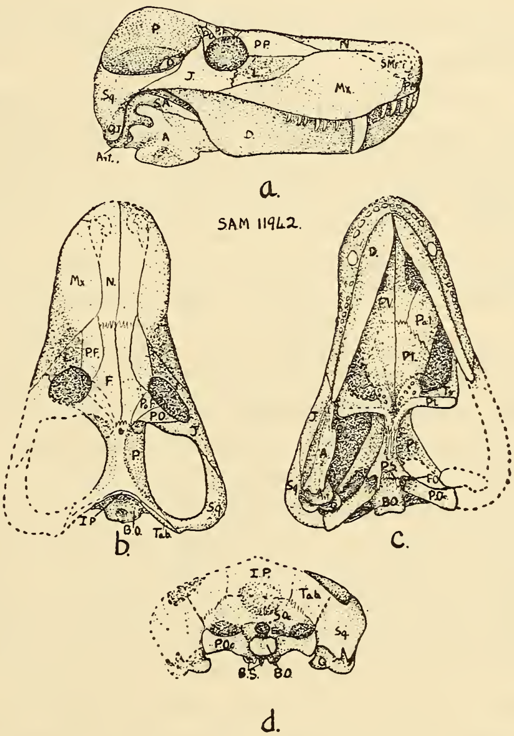

Fig. 6.—*Ptomalestes avidus*. Type. S.A.M. 11942. (× $\frac{1}{6}$.) *a*, Lateral view. *b*, Dorsal view. *c*, Ventral view. *d*, Occipital view.

In lateral view (Fig. 6*a*) the maxilla is seen to be low and long and has a long overlap on the premaxilla; the small slender post-canines are irregularly spaced and occupy 51 mm. with a diastema of 12 mm. to the canine; anterior to the canine the maxillary edge curves upwards ("step" of Watson) and the diastema is 13 mm. on the left and 15 mm. on the right side. On the premaxilla there are 5 incisors, fairly small and all more or less the same size. All the teeth have serrated sharp posterior edges.

The prefrontal is large with a dorsal and a lateral face.

The jugal has a stout dorsal ramus forming the lower and hind part of the postorbital bar; the posterior ramus extends moderately far backwards underlying the anterior part of the anterior squamosal ramus forming the infratemporal arch; the anterior jugal ramus is short.

The postorbital is of moderate size forming the postero-dorsal corner of the orbital border and has only a short posterior tongue applied to the lateral face of the parietal.

The squamosal has a deep descending process to hold and support the quadrate and quadratojugal, but I have not been able to determine the relations of these three bones as seen in lateral view.

The temporal fossa is short but roomy.

The angular has a fairly large external face with radiating ridges and posteriorly a deep notch and a well developed reflected lamina with a thin ventral edge. The surangular forms, in lateral view, the dorsal girderlike border of the jaw between the dentary and the articular. The lower edge of the dentary is straight and the posterior edge concave between the angle and the strong coronoid process, which, extending into the temporal fossa, stands out well dorsal to the surangular and the dentigerous border of the dentary.

In dorsal view (Fig. 6*b*) the parietals are seen to form a moderately high, fairly sharp sagittal crest. The frontal is fairly short, narrow and is practically excluded from the orbital border. The postfrontal is quite well developed and the prefrontal has a large dorsal surface. The occipital edge is fairly deeply concave with only the dorsal edges of the interparietal and tabulars seen in dorsal view, but the posttemporal arch does not sweep very much in posterior direction. The temporal fossa is short but wide.

In ventral view (Fig. 6*c*) the dentaries are in position so that the anterior and lateral portions of the palate are not exposed. The choanal openings are short and the interchoanal bar formed by the prevomers stout. Posteriorly the prevomers form a truncated spatulate sheet of bone underlying the palatines and pterygoids. The palatine is of fair size with its outline roughly that of a parallelogram; it carries an oblique ridge which is continued on the pterygoid. The anterior pterygoidal rami form a median flat surface laterally bounded by the above mentioned oblique ridges; no teeth can be seen on these ridges; laterally the pterygoid bounds the large suborbital vacuity; posteriorly the anterior ramus carries an eminence in which a number of small teeth are implanted mainly in a curved row. The transverse pterygoidal ramus forms a moderately strong bar inclined ventrally in lateral direction; its corner does not descend so far as the ventral edge of the dentary where this forms its obtuse angle. Posteriorly the pterygoid clasps the anterior process of the parasphenoid and forms the lateral sheets of bone of the fairly deep median keel. The quadrate ramus of the pterygoid has a fairly straight lateral edge, well removed from the braincase, and meets the quadrate.

I have not been able to determine the relations of the epipterygoid to the quadrate ramus of the pterygoid.

The transversum is biramic; a transverse ramus is applied, as a vertical sheet of bone, to the anterior face of the transverse pterygoidal ramus; a longitudinal ramus forms a girder, ascending in the skull in anterior direction to meet the palatine at its junction with the maxilla, and laterally bounding the large suborbital vacuity.

The parasphenoid forms a fairly deep median keel anteriorly clasped by the pterygoids, and presumably forms the underface of the basisphenoidal tubera. The basisphenoidal tubera are situated well below the level of the basioccipital condyle; their posterior borders are developed as a sharp ridge forming the anterior part of the deep rim bounding the *fenestra ovalis;* the medial part of the rim of the fenestra is formed by an equally sharp ridge formed by the basioccipital confluent with that of the basisphenoid. Medially to the deep rim of the *fenestra ovalis* the under surface of the basisphenoid and basioccipital appears as a wide deep groove.

The strong opisthotic abutting against the basisphenoid and basioccipital forms the outer and more dorsally situated part of the border of the *fenestra ovalis.* Laterally the paroccipital bar abuts against the everted sheet of the squamosal which forms the inner face of the auditory groove.

The lower jaw, being in articulation, covers most of the quadrate in ventral view, but medially the inner rounded edge of the median condyle can be seen and laterally the posterior edge of the lateral quadratic condyle.

The sharp ventral edge of the reflected lamina of the angular is shown in fig. 6*c* as is also the unankylosed mandibular symphysis.

In occipital view (Fig. 6*d*) it is evident that the occiput is low and that the quadrate complex lies well below the *basis cranii* and that the squamosal bulging outwards lateral to the roomy temporal fossa has not carried the quadrate laterally with it. The limits of the interparietal, supraoccipital and tabulars cannot all be determined, but where uncertain are probably as shown in broken lines. The posttemporal fenestrae are large, the auditory groove fairly shallow but above the *foramen magnum* there is a very deep circular depression. The paroccipital bar is strong and the descending sheet of the squamosal covers the greater part of the face of the quadrate. The deep rims of the *fenestra ovalis* are clearly seen and are formed by the basisphenoid and basioccipital.

S.A.M. 11460. Buffelsvlei, Beaufort West. Coll. Boonstra and Marais.

This specimen consists of an imperfect anterior half of a skull smaller than that of the type. There are 5 incisors and 5 postcanines; the incisors are fairly weak, the first 4 subequal and the 5th much smaller; the postcanines are small and slender; on both sides the 3rd is missing; they occupy 20 mm. on the left and 22 mm. on the right side; the diastema anterior to the canine as well as that posterior to it measures 12 mm. On the assumption that its smaller size and the differences in the dentition may be due to its being a juvenile I am including this specimen in the species *avidus,* but with corroborative evidence from a more fully preserved skull it may well prove to be a smaller species specifically distinct from the genotype.

S.A.M. 9012a. Klein-Koedoeskop, Beaufort West. Coll. Boonstra.

This specimen is an anterior weathered part of a snout in which the incisors agree with those of the type.

Genus *Pristerosaurus* Gen. Nov.

Fairly large Pristerognathids with the dental formula i.?, c.1, p.c.3 (in all probability there were 6 incisors); the canine small and weak; the postcanines also small and weak and closely packed; in all probability the incisors were also small and weak.

Skull fairly large (Max. Length 225? to 255? mm.); preorbital hollow shallow to very shallow without definite margins; frontal with small entry into the orbital border; postfrontal well developed; snout broader than high, not narrowed between orbit and canine; orbits in all probability in anterior half of skull. Sagittal crest of parietals high and sharp.

Pristerosaurus microdon Sp. Nov. (Fig. 7.)

Genotype. S.A.M. 9083. Rietkuil, Beaufort West. Coll. Boonstra.

A well preserved skull lacking only the precanine portion of the snout.

In lateral view (Fig. 7*a*) the maxilla is seen to be short but high. The canine is small, probably not more than 15 mm. long and antero-posterior diameter 6 mm; the three small postcanines occupy 13 mm. on the right side and 15 mm. on the left. The prefrontal is large with a rounded ridge separating a dorsal from a lateral face. The jugal is a large triradiate bone; the dorsal ramus forms the major part of the postorbital bar; the posterior ramus extends far posteriorly and with the anterior ramus of the squamosal which overlies it forms the infratemporal arch. (In this feature this early Therocephalian exhibits a condition found in the later Cynodonts and not found in the Gorgonopsians.) The anterior jugal ramus forms the infraorbital bar with its extremity wedged in between the lacrimal and maxilla.

The postorbital forms the postero-dorsal part of the orbital margin and curving towards the median line is applied to the temporal face of the sagittal crest formed by the parietal, but does not extend far in posterior direction.

The squamosal has a deep descending process supporting the quadratojugal and quadrate, but the displacement of the lower jaw has disturbed the articulatory region so that the relations here are difficult to determine.

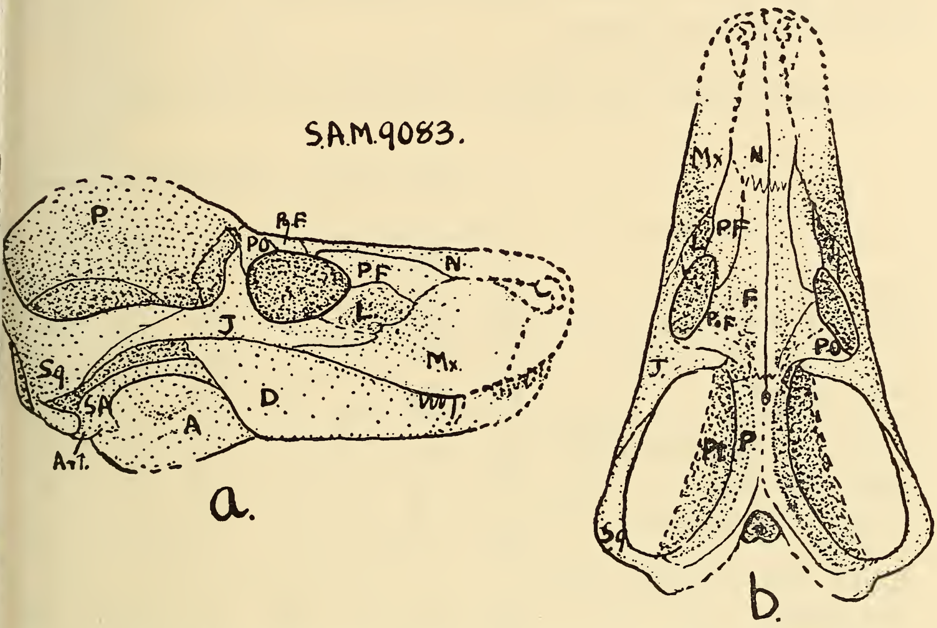

Fig. 7.—*Pristerosaurus microdon*. Type. S.A.M. 9083. (× $\frac{1}{3}$.) *a*, Lateral view. *b*, Dorsal view. Left temporal arch corrected on basis of the right side.

The angular has a large external face with a notch situated above the reflected lamina; a curved ridge separates a dorsal hollow from the lower part of the external surface.

The temporal fossa is long and roomy.

In dorsal view (Fig. 7*b*) the high sharp parietal crest is evident. The frontal is long with a small entry into the orbital border and the prefrontal has a large dorsal face separated from the lateral face by a rounded ridge.

The occiput is deeply concave with the posttemporal arch sweeping far posteriorly. Above the *foramen magnum* the occiput is very deeply excavated; the posttemporal fossae are small; the paroccipital is strong, with its distal end everted where it meets the squamosal to form the inner boundary of the deep auditory groove.

Little of the ventral surface could be prepared; the condyle is moderately large and single; the basisphenoidal tubera are very strong (as in *Trochosaurus*) and the *fenestra ovalis* has a prominent sharp ventral rim; the parasphenoidal keel is deep and narrow. The quadrate complex is posteriorly overlapped by a sheet of the squamosal descending far ventrally.

The specimen in the British Museum B.M.N.H. R.4100 which has been referred to *Lycosuchus* and then to *Scymnosaurus* can obviously not be included in either of these two genera and undoubtedly falls within the limits set for the genus instituted here and constitutes a second species—*Pristerosaurus watsoni* (Broom).

Measurements. *Glanosuchus, Ptomalestes* and *Pristerosaurus*

	Glanosuchus.				*Ptomalestes.*		*Pristerosaurus.*
	637	11843	11964	903	11942	11460	9083
Pr.Mx.—B.O. condyle . . .	310	300?	—	—	250	—	210?
Pr.Mx—Post.Sq. edge . . .	321?	315?	—	—	258	—	234?
Pr.Mx.—Ant.Orb. border . .	172	169	—	—	132	115?	90?
Pr.Mx.—Pin.For.	235	233	—	—	185	—	153?
Width of Snout over Canines	82	80	70	—	65	70	48?
Width of Snout over last P.C.	85	85?	71	—	95	75	58
Width Interorbital	52	54	—	—	44	—	40
Width Intertemporal over Pin.For.	25	23	—	—	24	—	20
Height of Snout at Post. Edge of Canine	80	61	—	86	55	47	55?
Height at P.O. bar	53	55?	—	—	40?	—	45
Length of Upper Incisor Series l.	55	47	45	—	40	35	—
r.	55	50	45	45	40	35	—
Diastema C.—I. . . . . . l.	—	10	17	—	13	12	—
r.	7	13	16	10	15	13	—
Diastema C.—P.C. . . . l.	—	—	—	—	12	12	2
r.	16	18	15	12	12	12	2
Length of P.C. Series . . l.	—	—	—	—	—	20	16
r.	46	48?	21+	—	51	22	15
Ant.-Post.Diam. of Canine l.	20	18	18	—	13	12	—
r.	21	17	18	15	15	12	—

Genus *Therioides* Boonstra.

Boonstra, 1953, p. 58. Genotype. *T. cyniscus* Boonstra.

DIAGNOSIS

Fairly large Pristerognathids with the dental formula i.6, c.1, p.c.6; the incisors are subequal, moderately long and slender, the canine long and strong and the postcanines well spaced, small, slender teeth.

Skull fairly large (Max. Length 275 mm., as reconstructed); preorbital depression fairly deep but without abrupt margins and shallowing in the direction of the canine; frontal probably just entering orbital border; snout as broad as high, only slightly narrowed behind canines; orbit well in posterior half of skull.

Mandibular symphysis fairly weak, but mentum fairly upright.

Quadrate situated very low down in skull, far ventral of the occipital condyle.

Therioides cyniscus Boonstra. (Fig. 8.)

Boonstra, 1953, p. 58. Holotype. S.A.M. 11888. Vindraersfontein, Beaufort West. Coll. Boonstra.

A slightly distorted and somewhat weathered skull, together with part of the pectoral girdle, humerus, radius, ulna and part of manus.

In lateral view (Fig. 8) the maxilla is seen to be fairly low but long with a moderate overlap on the premaxilla; the small and slender postcanines are evenly spaced, occupying 39 mm. on the left and 40 mm. on the right side with a diastema of 10 mm. on the left and 9 mm. on the right side to the canine; the canine is robust and 48 mm. long; no "step" anterior to canine, and the diastema to the last incisor is small (10 mm. on left and 9 mm. on right). On the premaxilla there are 6 incisors occupying 33 mm. on the right and 5 incisors occupying 30 mm. on the left side; they are slender with a mean length of 15 mm.; the 6th is weaker than the anterior teeth. All the teeth have serrated sharp posterior edges. The septomaxilla has a fairly large facial exposure and the septomaxillary foramen is large.

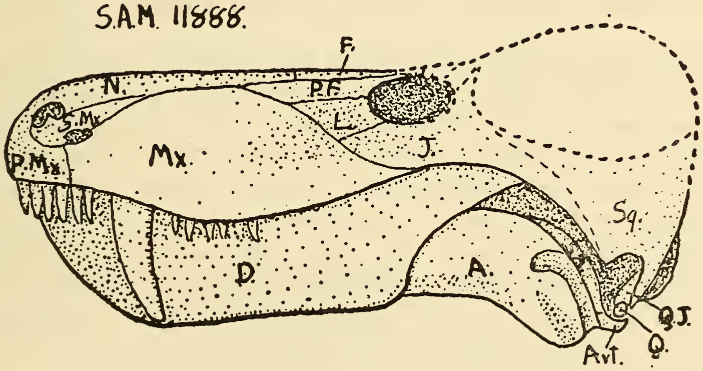

FIG. 8.—*Therioides cyniscus*. Type. S.A.M. 11888. (× ⅓.) Lateral view. Incorporating features of the right side.

The prefrontal is fairly large with a dorsal and a smaller lateral face. The jugal bar is strong. The squamosal has a very deep descending process carrying the quadrate very far down in the skull with the result that the articulation is situated on the same level as the ventral border of the dentary. I have recently described this area in detail (Boonstra, 1953).

The occiput is only partly preserved. The paroccipital is strong and its ventro-median corner well developed and this, together with the basioccipital and basisphenoid processes, forms the strong rim of the *fenestra ovalis,* which is thus situated low down in the skull, well below the level of the occipital condyle. The basisphenoidal tubera are well developed and the parasphenoidal keel deep. The posttemporal fenestra is fairly large and the auditory groove well developed. The lateral sweep of the squamosals has not carried the quadrates far laterally.

Genus *Pristerognathus* Seeley.

Seeley, 1895, p. 994. Genotype. *P. polyodon* Seeley.

DIAGNOSIS

Pristerognathids with the dental formula i.$\frac{6}{3}$, c.1, p.c.$\frac{3?}{3}$.

Pristerognathus polyodon, Seeley.

The holotype is in the British Museum (Natural History), B.M.N.H. R. 2581, Tamboerfontein, Beaufort West, and consists of a poor weathered snout.

This genus has only historical importance since the poor genotype shows only the following diagnostic characters: dental formula, i.$\frac{6}{3}$, c.1, p.c.$\frac{3?}{?}$. In the premaxilla the first incisor's root has a circular cross section and it lies close to its fellow; incisors 2-5 are ovate in section and the 6th is smaller than the anterior teeth; they occupy 35 mm. In the dentary there are three incisors decreasing in size in posterior direction; they are long and curved with finely serrated posterior edges; they occupy 17 mm. The upper canine has a diameter of 14 mm. and a serrated posterior edge. There is a step in the maxillary border anterior to the canine. The symphysis, formed chiefly if not entirely by the dentary, is unankylosed and the mentum is sloping. The width of the snout is 55 mm. and the height 46 mm. The bulge of the maxilla above the canine has a sub-crocodilian pitted surface.

Pristerognathus baini (Broom).

Broom, 1904, p. 87. Holotype. S.A.M. 583. Locality unknown. Coll. unknown.

A very poor weathered snout fragment.

There are roots of 6 upper and 3 lower incisors. The upper incisors occupy 34 mm. (measured round the curve); the 6th is smaller than the preceeding teeth; the first smaller than the succeeding 3 and lies close to its fellow. There is no reason for this fragment to bear a distinct specific name and I regard *baini* as a synonym of *polyodon*.

I propose that the generic name *Pristerognathus* be retained for Seeley's historic specimen and be used as a suitable label for all Pristerognathid Therocephalian specimens in which no other diagnostic characters are shown except the presence of 6 upper incisors occupying a space of 35 mm. For specimens showing other additional characters other generic names should be used as has already been done viz. *Alopecognathus, Cynariognathus,* etc.

The following list of specimens comprises a number of fragmentary and weathered snouts which on the nature of the incisors can only be referred to the genus *Pristerognathus* as characterised above.

S.A.M.	631	Koup.	Coll. Joubert.
,,	751	Seekoeigat, P.A.	Coll. Du Plessis.
,,	752	Seekoeigat, P.A.	Coll. Du Plessis.
,,	1075	Rietfontein, P.A.	Coll. J. H. Whaits.
,,	1213	Unknown locality.	
,,	3432	Janwillemsfontein, P.A.	Coll. Haughton & Whaits.
,,	9015	Klein-Koedoeskop, B.W.	Coll. Boonstra.
,,	9084a	Rietkuil, B.W.	Coll. Boonstra.
,,	9111	Die Vlei, P.A.	Coll. Boonstra.
,,	11456	Buffelsvlei, B.W.	Coll. Boonstra & Marais.
,,	11586	Koedoeskop, B.W.	Coll. Boonstra.
,,	11842	Lammerkraal, P.A.	Coll. Boonstra.
,,	11848	Veldmansrivier, P.A.	Coll. Boonstra.
,,	11871	Perdewater, P.A.	Coll. Boonstra.
,,	11872	,, ,,	,, ,,
,,	11873	,, ,,	,, ,,
,,	11874	,, ,,	,, ,,
,,	11875	,, ,,	,, ,,
,,	11876	,, ,,	,, ,,
,,	11936	Bosluiskraal, Laingsburg.	Coll. Boonstra.
,,	11956	Klein-Koedoeskop, B.W.	Coll. Boonstra.
,,	11957	Abrahamskraal, P.A.	Coll. Le Roux.
,,	11960	Dikbome, Laingsburg.	Coll. Boonstra.
,,	11963	Dikbome, Laingsburg.	Coll. Boonstra.
,,	11965	Skoppelmaaikraal, Laingsburg.	Coll. Botes.
,,	11966	Seekoeigat, P.A.	Coll. T. Bain.
,,	11967	Seekoeigat, P.A.	Coll. T. Bain.

Genus *Alopecognathus* Broom.

Broom, 1915, p. 116. Genotype. *A. angusticeps* Broom.

The holotype of this species is in the American Museum of Natural History. A.M.N.H.5559. Coll. Whaits.

DIAGNOSIS

Moderate to fairly large Pristerognathids with the dental formula i.6, c.1, p.c.4-5; the anterior incisors are fairly long, slender teeth (the 1st incisors, as in all Pristerognathids, are smaller than the 2nd to 5th) but the 6th is appreciably to very much smaller; the canine is long and strong; the postcanines are small and fairly weak, not close set.

Skull moderate to fairly large (Max. Length 240? mm. to 276 mm.); preorbital hollow varies from a fairly shallow hollow shallowing evenly in the direction of the canines and without abrupt borders to a deep depression with sharply demarcated borders especially anteriorly; septomaxilla with well developed facial exposure and septomaxillary foramen well developed; frontal with small entry into orbital border or just excluded from it; prefrontal large with well marked dorsal and lateral face; postfrontal moderately to well developed; snout wider than high, broader over last postcanines than over canines; orbits just entering anterior half of skull.

Mandibular symphysis weak and mentum sloping very much.

Sagittal crest of parietals moderately high but with sharp edge.

Quadrate low down, but well above the level of the lower border of the dentary.

Temporal fossa fairly long and wide.

Squamosal with everted lateral edge.

Alopecognathus angusticeps Broom.

The holotype in the American Museum has been redescribed by me some years ago when studying the South African specimens sold by Dr. Broom to the American Museum (Boonstra, 1935; p. 2).

DIAGNOSIS

There are 5-6 postcanines; maximum length of skull 275 mm.; preorbital depression fairly shallow to deep, extending in direction of canine; postfrontal well developed; squamosal laterally everted.

S.A.M. 9112 (Fig. 9). Stinkfontein, Prince Albert. Coll. Boonstra.

A fairly well preserved anterior three quarters of a skull.

From the figures and from the accompanying list of measurements it is clear that this specimen from Stinkfontein is co-specific with the genotype, notwithstanding certain less important differences e.g. in our specimen there are 6 postcanines occupying 40 mm., and the preorbital depression is deep.

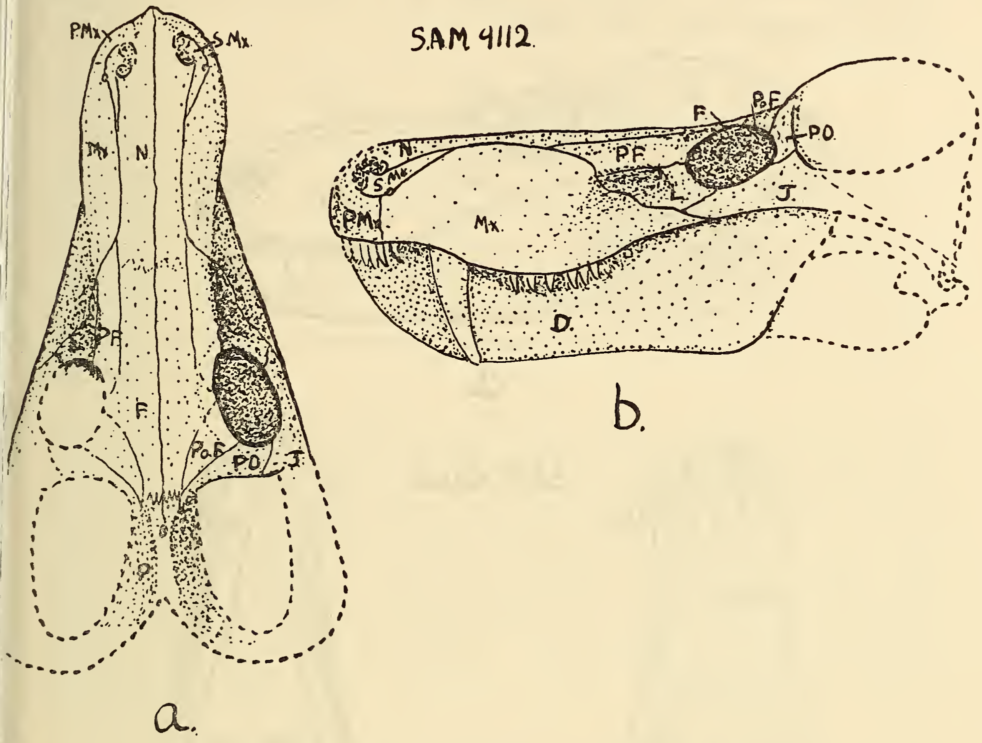

Fig. 9.—*Alopecognathus angusticeps*. S.A.M. 9112. ($\times \frac{1}{3}$.)
a, Dorsal view. *b,* Lateral view.

This specimen allows us to correct two points in my description (Boonstra, 1935) of the genotype viz. with the anterior part of the sagittal crest preserved it is now clear that in my reconstruction the height of the crest should have been much higher; the preserved frontonasal suture in this specimen shows that the broken line indication in my figure of 1935 should have been further forward so that the frontal is a long narrow bone and the nasal shorter than I thought in 1935.

Alopecognathus angustioriceps (Boonstra).

Boonstra, 1953, p. 63. Holotype. S.A.M. 9342. (Fig. 10.) Kroonplaas, Beaufort West. Coll. Boonstra.

A very good undistorted and practically complete skull.

Diagnosis

There are 5 postcanines; maximum length of skull 252 mm.; preorbital depression shallow, continued anteriorly as a shallow groove; postfrontal small; squamosal with lateral bulge.

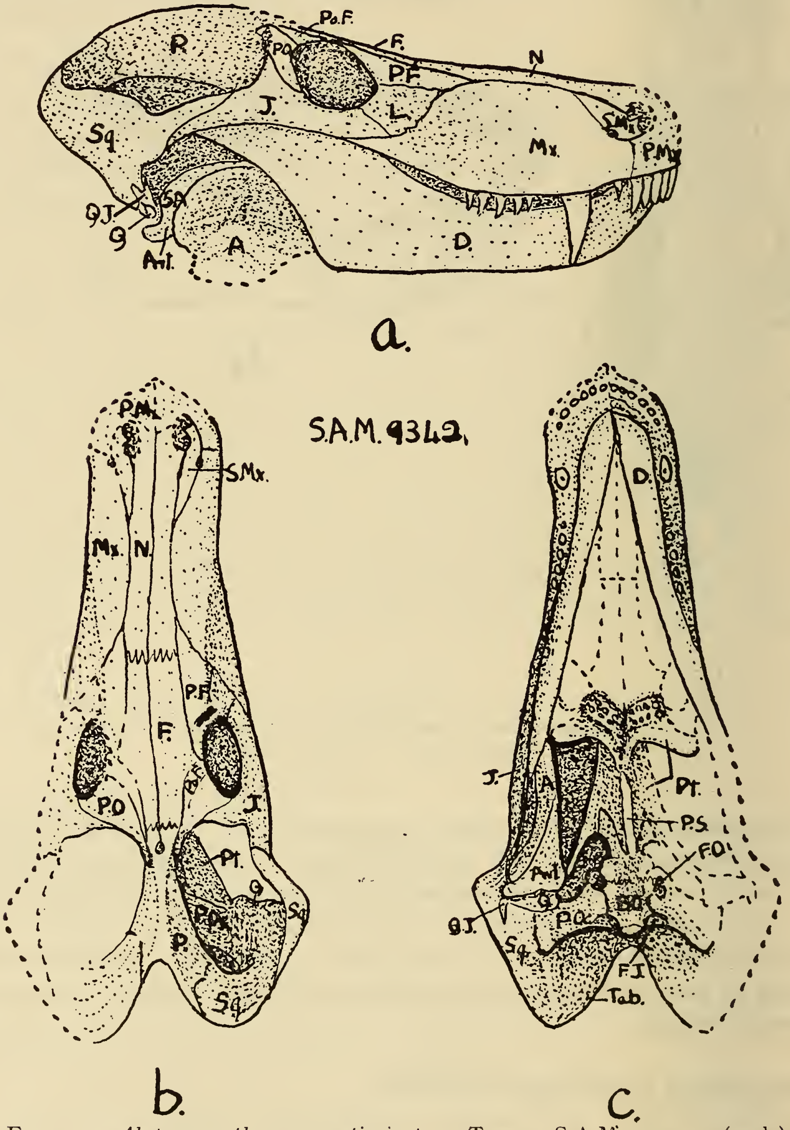

Fig. 10.—*Alopecognathus angustioriceps*. Type. S.A.M. 9342. (× $\frac{1}{3}$.)
a, Lateral view. *b*, Dorsal view. *c*, Ventral view.

In lateral view (Fig. 10*a*) the maxilla is seen to be fairly low and of moderate length with a moderate overlap on the premaxilla; it carries 5 small

(1st very small) postcanines occupying 27 mm. on the left and 29 mm. on the right side. The diastema between canine and the first postcanine is 10 mm. on the left and 11 mm. on the right. The canine is well developed with a length of 30? mm. and antero-posterior diameter of 14 mm. Anterior to the canine is a diastema of 12 mm. on the left and 14 mm. on the right. The premaxilla carries 6 teeth, the anterior 5 are long and slender and the 6th small and slender occupying 33 mm. on both sides.

The septomaxilla has a well developed facial surface and intra-nostril spur. The prefrontal has a small lateral face. The jugal has a short dorsal ramus and a well developed posterior ramus overlain by a moderately long anterior ramus of the squamosal. The postorbital forms most of the postorbital bar. The squamosal has a deep descending ramus supporting the quadrate complex. I have recently figured and described the suspensorial region (Boonstra, 1953). The dentary is large with a strong coronoid process; the symphysis is weak and the mentum sloping.

In dorsal view (Fig. 10*b*) the long slender shape of the skull is evident; the orbits just enter the anterior half of the skull; the temporal fossa is long and roomy; the everted anterior ramus of the squamosal forming most of the lower temporal arch is noteworthy (seen also in the genotype). The frontal is just excluded from the orbital margin; both the frontal and nasal are narrow. The prefrontal has a large dorsal face bounded laterally by a sharp ridge. The postfrontal is small and the postorbital well developed but extending little along the lateral face of the parietal. The parietals are narrow and form a sharp sagittal crest which is, however, not high. The upper occipital edge is very deeply concave.

In ventral view (Fig. 10*c*) it is seen that with the dentaries in position it has not been found feasible to clean the anterior part of the palate. Just anterior to the transverse rami of the pterygoids the pterygoids bear two dentigerous ridges. The lateral corner of the transverse pterygoidal ramus lies in the plane of the angle of the dentary but does not descend to the level of the ventral edge of the dentary. Posteriorly the pterygoid clasps the parasphenoidal rostrum which lies in the median line and the quadrate ramus, with a slightly curved lateral edge, extends to the quadrate. The parasphenoidal keel is deep. The basisphenoidal tuber, the medio-ventral corner of the opisthotic and the antero-lateral corner of the basioccipital form three distinct protuberances which constitute the tripartite rim bounding the *fenestra ovalis*. The paroccipital bar is strong; the basioccipital condyle fairly weak. The squamosal extends down far to cover the posterior face of the quadrate complex. The squamosal sweeps far posteriorly to make the occiput deeply concave, and the occipital condyle and the quadratic condyles are situated far anterior to the posterior limits of the skull. The quadratic condyles also lie in a plane well ventral to that of the occipital condyle.

Measurements. *Alopecognathus*

		A.M.N.H. 5559	S.A.M. 9112	S.A.M. 9342
Pr.Mx.—B.O. condyle		234	—	215
Pr.Mx.—Post.Sq. edge		275	260	252
Pr.Mx.—Ant.Orb. border		140	138	117
Pr.Mx.—Pin.For.		210	210	180
Width of Snout over Canines		55	56	50
Width of Snout over last P.C.		68	70	53
Width Interorbital		35	45	40
Width Intertemporal over Pin.For.		10?	15	17
Height of Snout at Post. edge of Canine		50	51	48
Height at Post.Orb. bar		45	42	45
Length of Upper Incisor Series	l.	33	34?	33
	r.	—	34?	33
Diastema C.—I.	l.	12	12	12
	r.	—	—	14
Diastema C.—P.C.	l.	12	16	10
	r.	—	—	11
Length of P.C. Series	l.	31	40	27
	r.	—	39	29
Ant.-Post.Diam. of Canine	l.	12	15	13
	r.	—	—	13

Genus *Cynariognathus* Broom.

Broom, 1931, p. 161. Genotype. *C. platyrhinus* Broom.

The holotype of this species is in the American Museum of Natural History. A.M.N.H. 5502. Collected by J. H. Whaits and sold to the American Museum by Dr. Broom.

Diagnosis

Medium sized Pristerognathids with the dental formula i.5-6, c.1, p.c.6-9; the posterior incisors are smaller than the anterior ones; the canine is long and strong; the postcanines are fairly strong and closely set.

Skull of medium size (Max. Length 260-290 mm.); preorbital depression shallow; septomaxilla fairly small; frontal with a moderate entry into the orbital border; prefrontal large with well marked dorsal and lateral face; postfrontal moderately developed; snout broader than high; broader over last postcanines than over canines; orbit in posterior half of skull; skull low over postorbital bar; orbits high up in the skull. Premaxilla weak. Angle of dentary obtuse with posterior edge of dentary not deeply concave. Dentary not shallow behind the canine.

Cynariognathus paucioridens. Sp. Nov. (Fig. 11.)

Holotype. S.A.M. 11560a. Kroonplaas, Beaufort West. Coll. Boonstra.

A weathered snout with some parts of the postcranial skeleton.

DIAGNOSIS

Six closely packed postcanines occupying 27 mm. on the left and 28 mm. on the right side; breadth of snout over the canines 50 mm.; height of snout at posterior edge of canine 40 mm.; preorbital length of skull 99 mm.

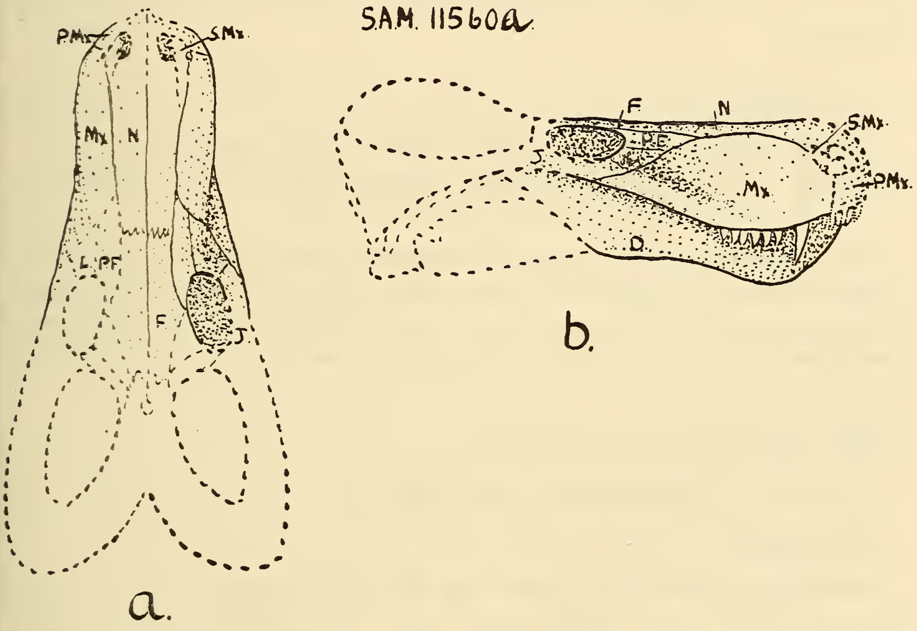

Fig. 11.—*Cynariognathus paucioridens.* Type. S.A.M. 11560a. (× ⅓.)
a, Dorsal view. *b,* Lateral view.

This skull has a long low maxilla, the lacrimal is large and the prefrontal fairly small; the dentary is fairly lightly built; the preorbital groove is fairly deep. Little more can be determined from this specimen and I would have hesitated to name it were it not that a second specimen, also with 6 closely packed postcanines, proves that we have here a definitely new species of *Cynariognathus.*

S.A.M. 11586. Koedoeskop, Beaufort West. Coll. Boonstra.

The antorbital weathered half of a skull.

Here there are 6 closely packed, fairly weak postcanines occupying 28 mm. and there are apparently 5 incisors occupying 30 mm.; the height of the snout is 40 mm. and the width 53 mm.; the antorbital length is 100? mm.

S.A.M. 1080. Fraserburg Rd., Prince Albert. Coll. J. H. Whaits.

A weathered antorbital part of a skull together with a complete hindfoot.

In this specimen there are 7 postcanines; they are closely set and robust and occupy 26 mm. The height of the snout is 35 mm. and its breadth 48 mm.; the antorbital length as estimated is only 75 mm. The shorter snout and the larger number of postcanines make inclusion in the above species provisional.

Cynariognathus spp.

S.A.M. 3713. Bloukrans, Prince Albert. Coll. Haughton.
S.A.M. 9088a. Klein-Koedoeskop, Beaufort West. Coll. Boonstra.
S.A.M. 11968. Locality and Collector unknown.

These three incomplete snouts are included in the genus *Cynariognathus* as the height of the snouts is much smaller than the breadth and because in the postcanine series the teeth are closely packed. But as the posterior postcanines are not preserved the determination of the species remains uncertain.

Genus *Pristerognathoides* Gen. Nov.

Genotype. *Alopecognathus minor* Haughton.

DIAGNOSIS

Medium sized Pristerognathids with the dental formula i.6, c.1, p.c.5-6; the incisors are small to fairly strong teeth, with the 6th incisor only slightly to much smaller than its predecessors; the canine is fairly long; the postcanines are small, weak and well spaced.

Skull of medium size (Max. Length 222-287 mm.); preorbital depression shallow to fairly shallow continuing as a groove in the direction of the canine; septomaxilla fairly small; frontals with a fairly small entry into the orbital border; prefrontal large with well marked dorsal and lateral face; postfrontal moderately well developed; snout wider than high; broader over last postcanine than over canines; orbits in posterior half of skull or just entering anterior half; skull very low over postorbital bar; orbits high up in skull.

Sagittal crest high and with sharp edge. Quadrate fairly low down, but well above the level of the lower border of the dentary.

Temporal fossa fairly long and moderately wide.

Premaxilla weak.

Squamosal with lateral edge not everted.

Angle of dentary squarish with fairly deep concave posterior edge sweeping far posteriorly towards the coronoid process. Dentary shallow behind lower canine.

Pristerognathoides minor (Haughton). (Fig. 12.)

Haughton, 1918, p. 180. Holotpye. S.A.M. 3415. Klipbank, Beaufort West. Coll. Whaits.

A good skull lacking only the temporal arches.

Diagnosis

There are 4 postcanines; maximum length of skull 240? mm.; preorbital depression deep with very definite and abrupt margins; postfrontal large.

Since Haughton's description I have carried the development of the skull further, exposing more of the palate, and removed the matrix from the preorbital depression.

In lateral view (Fig. 12*a*) the maxilla is seen to be low and long with a long overlap on the premaxilla; on the right 4 postcanines are preserved but there is a space between the 1st and 2nd which may have housed an additional tooth; the length of the series is 28 mm.; on the left 3 postcanines are preserved with a gap between the 1st and 2nd; the length of the series is 26 mm.; the postcanines are short but stout. Between the 1st postcanine and the canine there is a diastema of 8 mm. on the left and 12 mm. on the right side. The canine is long and strong (diameter 11-12 and length 24? mm.). Anterior to the canine there is a diastema of 10 mm. to the last incisor. There are 6 incisors of which the 5th and 6th are shorter than the anterior ones and the series occupies 32 mm. on both sides. All the teeth have finely serrated posterior borders.

The septomaxilla has a fairly large facial exposure and a well developed intra-nostril spur; the septomaxillary foramen is fairly large. The preorbital depression is a deep hollow, especially on the right side, with a sharp rim, especially along its dorsal and ventral borders; a low longitudinal ridge divides the hollow into two equal parts on the right side, but on the left the lower part is the larger; anteriorly the hollow ends abruptly and is not continued in the direction of the canine.

The bulge of the maxilla above the canine is not rugosely pitted. The anterior orbital border just enters the anterior half of the skull. The postfrontal is very well developed with a large entry into the orbital border; whereas the postorbital appears to have only a very small entry into the orbital border, forming the posterior part of the postorbital bar.

The edge of the sagittal crest is not preserved but was probably sharp and fairly high with little flanking of the parietal by the postorbital.

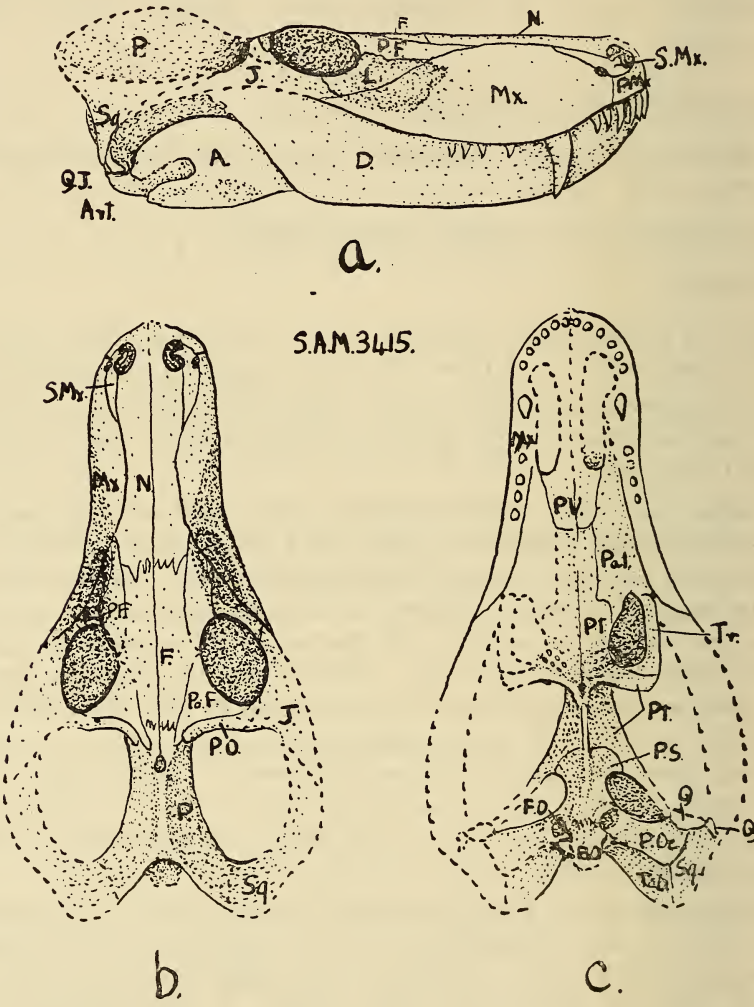

FIG. 12.—*Pristerognathoides minor*. Type. S.A.M. 3415. (× ⅓.) *a*, Lateral view. Incorporating features of the left side. *b*, Dorsal view. *c*, Ventral view.

The articulatory region is not well shown since the bone has been stripped. The angular has a deep notch and a small bone above the articular I have identified as the quadratojugal. The squamosal has a deep descending process posteriorly supporting the quadrate complex.

In dorsal view (Fig. 12*b*) the width across the temporal arches (as restored) is great making a roomy although short temporal fossa, whereas the snout, unconstricted behind the canines, is relatively narrow. The frontal is fairly small and probably just excluded from the orbital border. The postfrontal is very large and the postorbital weak, both with little posterior prolongation along the lateral face of the parietals. The prefrontal has a well developed dorsal face separated from the smaller lateral face by a sharp ridge which also forms the sharp dorsal rim of the preorbital depression. The nasals are large, expanded anteriorly and posteriorly. The dorsal occipital edge is deeply concave.

In ventral view (Fig. 12*c*) development has exposed all but the choanal region of the palate. The posterior ends of the prevomers form a shovel-shaped sheet of bone underlying the palatines and pterygoids. The pterygoids have long anterior rami, which bear, in their posterior part, a dentigerous ridge; the transverse pterygoidal ramus is not very strong or wide and its anterior face is lined by a descending sheet of the transversum which extends anteriorly as a girderlike ramus to form the outer border of the large suborbital vacuity. There is a small interpterygoid vacuity. The outer edge of the quadrate ramus of the pterygoid is slightly concave, thus increasing the size of the temporal space. In the median line the parasphenoid underlies the basisphenoid and anteriorly forms a deep keel. Surrounding the *fenestra ovalis* there is a fairly strong rim formed by the basioccipital, opisthotic and basisphenoid-parasphenoid. The paroccipital bar is strong and its ventro-anterior corner abuts against the quadrate. Lateral to the quadrate lies a small quadratojugal which does not enter the condylar surface. The squamosal covers most of the posterior face of the quadrate complex.

S.A.M. 4332 (Fig. 13.) Wilgerbos, Prince Albert. Coll. Haughton.

A good skull of which some aspects of the internal structure have been described by Haughton (Haughton, 1918).

The skull is very similar to that of the holotype of *Pristerognathoides minor*. On the left side there are 5 postcanines occupying 29 mm. The distance between canine and postcanines is 15 mm. on the left side and between canine and postcanines is 15 mm. on the left side and between canine and incisor the diastema is 9 mm. and the 6 incisors measure 30 mm.

The preorbital depression is fairly deep, but shallows in the direction of the canine.

As is evident from the figures there are several other minor differences in the proportions of some of the surface bones, but notwithstanding these I am referring this skull to *P. minor*.

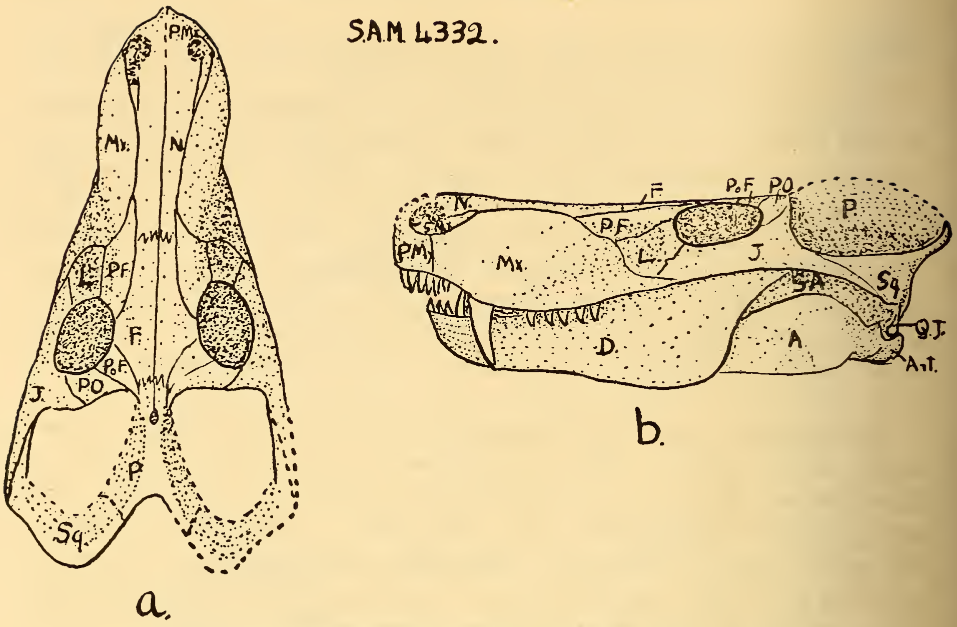

Fig. 13.—*Pristerognathoides minor*. S.A.M. 4332. (× ⅓.)
a, Dorsal view. *b*, Lateral view.

S.A.M. 3435 (Fig. 14). Jakkalsfontein, Prince Albert. Coll. Rogers. A well preserved antorbital part of a skull laterally compressed.

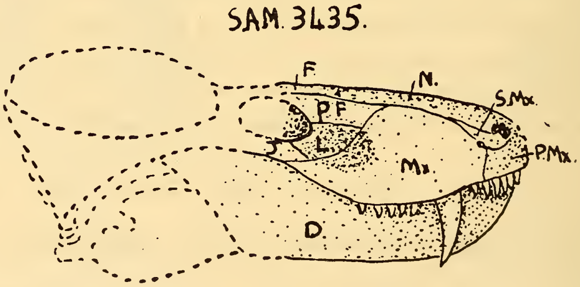

Fig. 14.—*Pristerognathoides minor*. S.A.M. 3435.
(× ⅓.) Lateral view.

Although the snout as preserved appears to be shorter and the maxilla consequently relatively higher and shorter than in the type, the dentition is very similar and the clearly demarcated preorbital depression has an abrupt anterior border as in the type specimen. I am thus referring this snout to *P. minor*.

S.A.M. 11891 (Fig. 15). Lammerkraal, Prince Albert. Coll. Boonstra & Pienaar.

A good skull lacking only the right postorbital and temporal arches.

In this skull there are on the right side roots of six postcanines. The snout is broader than in the type and the preorbital depression is fairly shallow and although there are other minor differences as can be seen from the figures and the table of measurements I am referring it to the species *minor*.

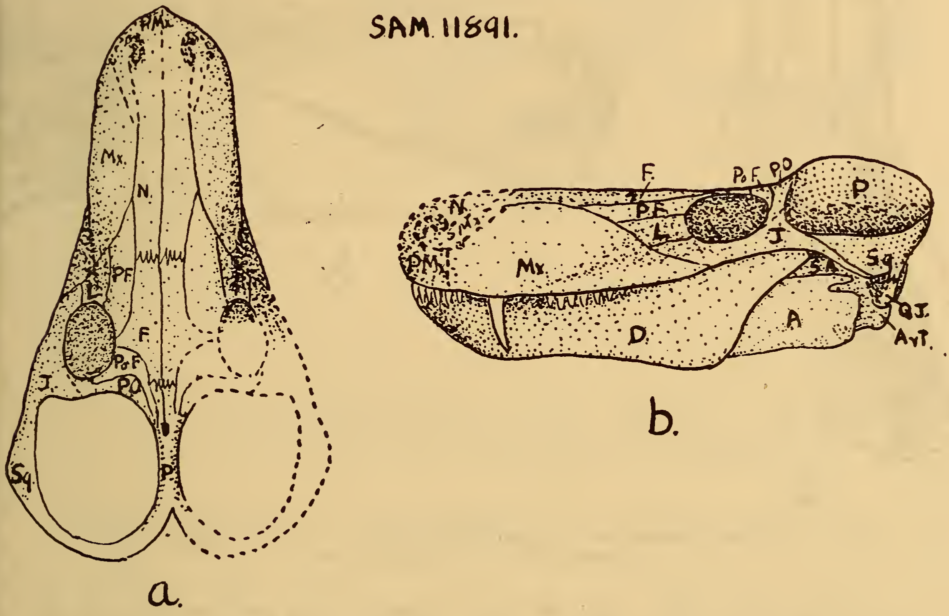

Fig. 15.—*Pristerognathoides minor*. S.A.M. 11891. (× ⅓.)
a, Dorsal view. *b*, Lateral view.

Pristerognathoides roggeveldensis (Boonstra). (Fig. 16.)

Boonstra, 1953, p. 60. Holotype. S.A.M. 9356a. Roggekloof, Sutherland. Coll. Walker.

A fair though somewhat distorted skull lacking the posterior part of the skull roof.

DIAGNOSIS

Skull long and narrow; with five weak, well spaced postcanines; incisors fairly strong with the 6th only slightly smaller than the 5th; orbit well in posterior half of skull; squamosal extending well forward on lateral face of parietal; prefrontal narrow.

In lateral view (Fig. 16*b*) the maxilla is seen to be long and high; the septomaxilla has a moderate facial exposure; the orbit is small and situated high up in the skull; the lacrimal large and the preorbital depression fairly shallow. I have recently (Boonstra, 1953) described the articulatory region.

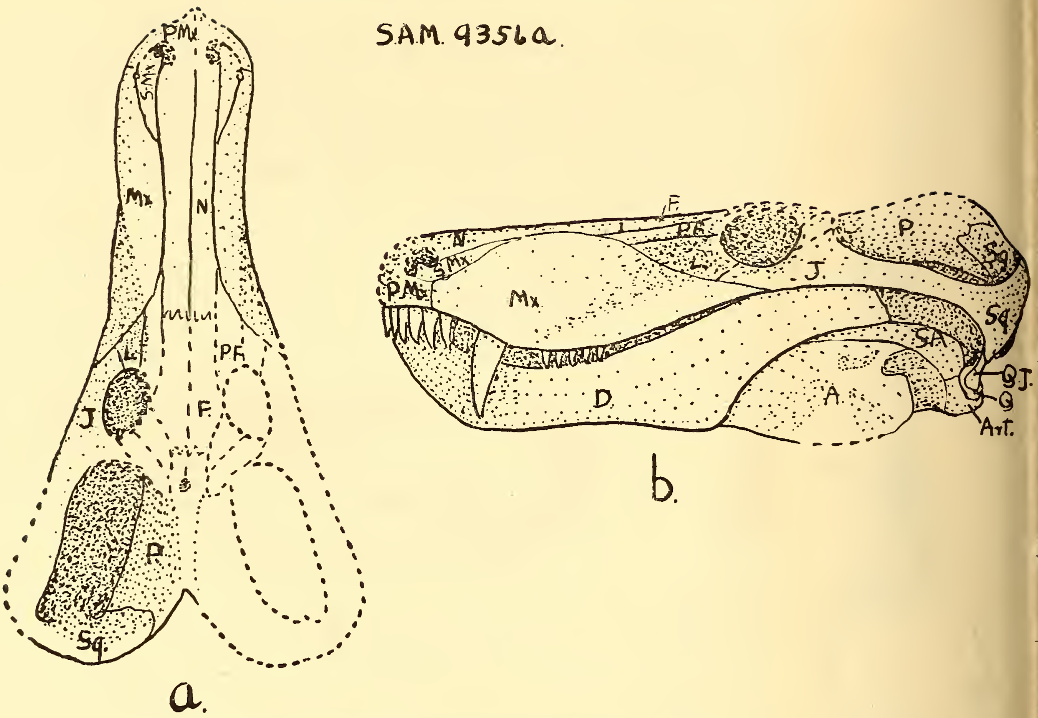

Fig. 16.—*Pristerognathoides roggeveldensis.* Type. S.A.M. 9356a. (× $\frac{1}{3}$.)
a, Dorsal view. *b,* Lateral view.

In dorsal view (Fig. 16*a*) the snout appears long and narrow and the temporal fossa long and narrow.

Pristerognathoides vanwyki (Broom). (Fig. 17.)

Broom, 1925, p. 318. Holotype. S.A.M. 6533. Bloukrans, Prince Albert. Coll. Le Roux.

A weathered and distorted skull.

DIAGNOSIS

Skull moderately long and narrow; with six weak well spaced postcanines; incisors fairly weak, with the sixth very slender; orbit just in posterior half of skull; prefrontal large.

In lateral view (Fig. 17*b*) the maxilla is seen to be fairly short and high; the septomaxilla has a good facial exposure; the orbit is small and situated high up in the skull; the lacrimal is large and the preorbital depression shallow.

In dorsal view (Fig. 17*a*) the skull is fairly long and fairly narrow and the temporal fossa fairly short and narrow.

S.A.M. 11893 (Fig. 18). Lammerkraal, Prince Albert. Coll. Pienaar.

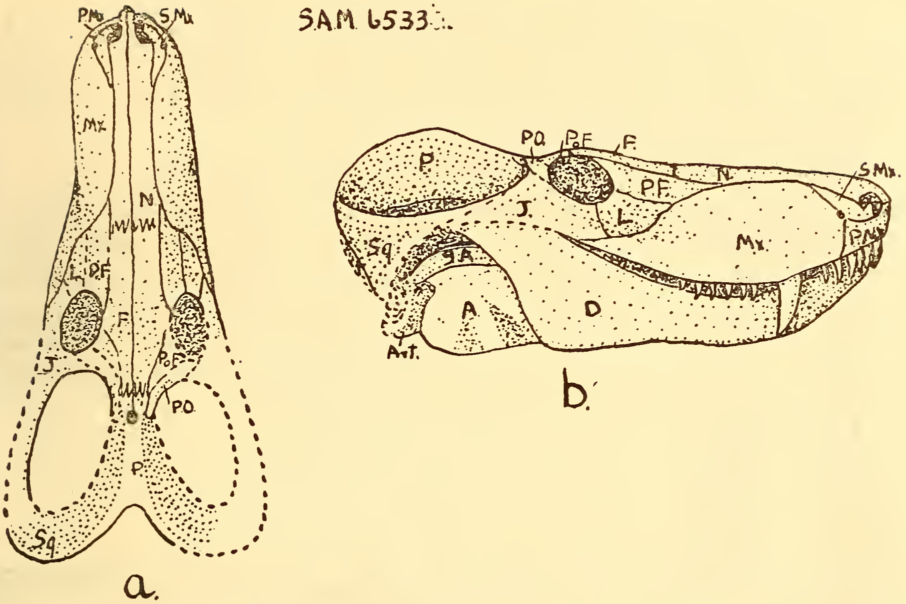

FIG. 17.—*Pristerognathoides vanwyki.* Type. S.A.M. 6533. (× ⅓.)
a, Dorsal view. *b*, Lateral view. Incorporating features of the left side.

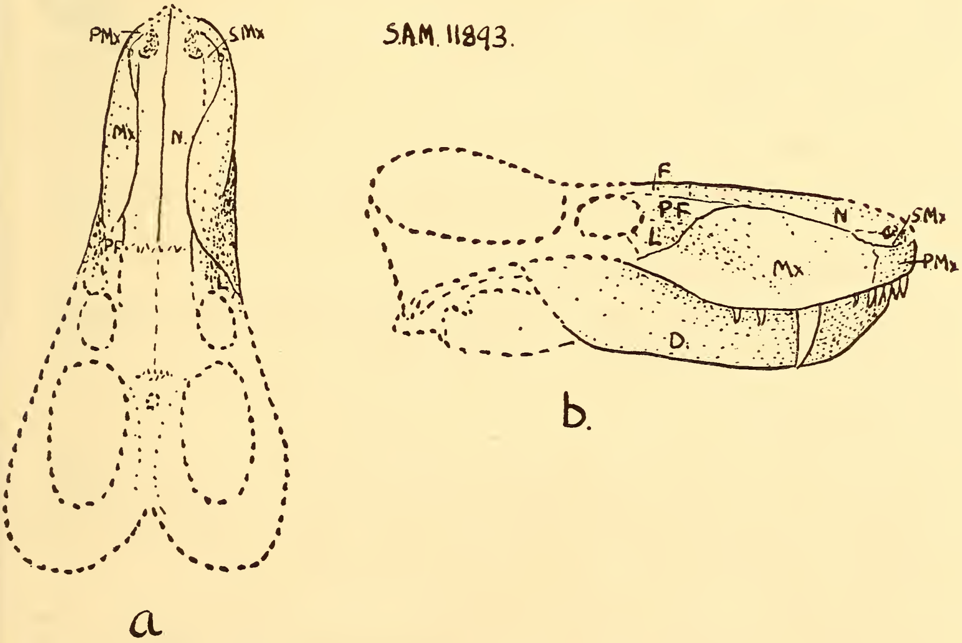

FIG. 18.—*Pristerognathoides vanwyki.* S.A.M. 11893. (× ⅓.)
a, Dorsal view. *b*, Lateral view.

This snout, presented to the Museum by Mr. J. Pienaar of Lammerkraal, has only two postcanines preserved, but as this is probably only due to postmortem loss and the other characters preserved agree fairly well with those of *vanwyki* I am referring it to that species.

S.A.M. 11689 (Fig. 19). Prince Albert Road. Coll. Hesse.

SAM 11684.

This dorso-ventrally crushed skull has the postcanines badly preserved but there were probably 6. Although the snout is longer and there are differences of actual size and proportions I am referring it to *vanwyki*.

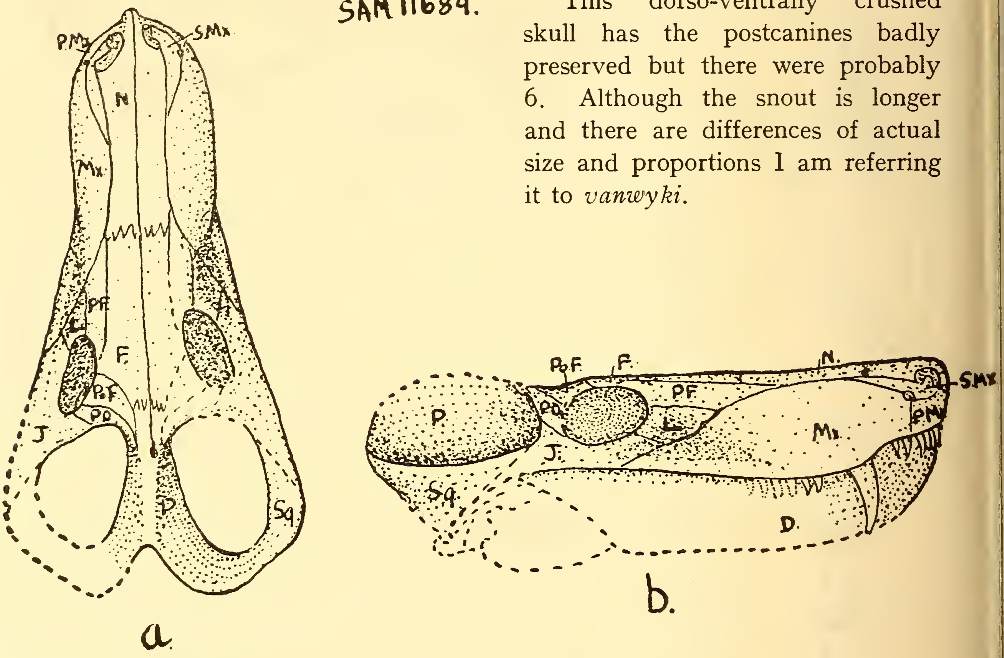

FIG. 19.—*Pristerognathoides vanwyki*. S.A.M. 11689. (× ½.) *a*, Dorsal view. *b*, Lateral view. Dorso-ventral crushing corrected.

Pristerognathoides parvus Sp. Nov. (Fig. 20.)

Holotype. S.A.M. 3611. Bloukrans, Prince Albert. Coll. Scholtz.

A weathered anterior two thirds of the skull.

DIAGNOSIS

Small low and fairly narrow skull; with 5 small well spaced postcanines; incisors weak with the 5th weaker than the anterior ones and the 6th very feeble, the diastema between incisors and canine great (15 mm.), and canine slender; prefrontal large; very low over postorbital arch.

The skull is small with the maximum length probably not more than 195 mm., the maxilla is long and low; the suborbital arch slender and the dentary weak; the preorbital depression quite deep.

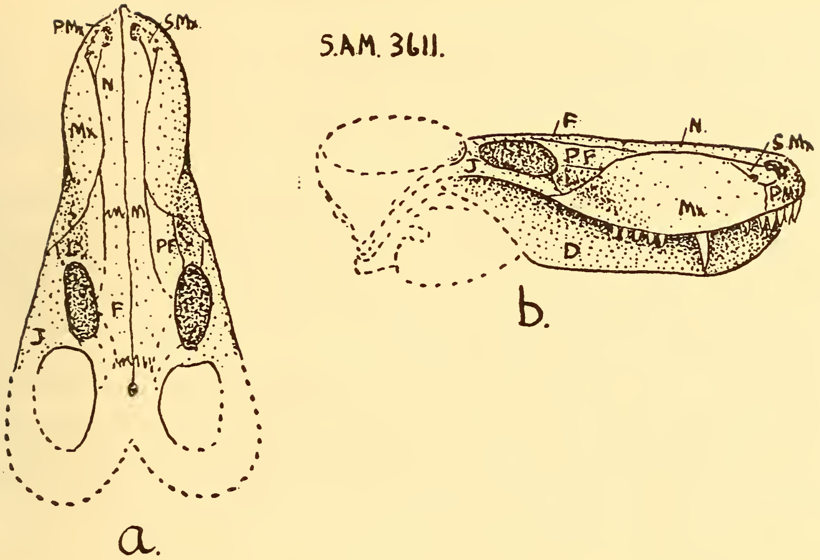

FIG. 20.—*Pristerognathoides parvus* Sp. Nov. Type. S.A.M. 3611. (× $\frac{1}{3}$.) *a,* Dorsal view. *b,* Lateral view. Incorporating some features of the left side.

MEASUREMENTS—*Pristerognathoides*

		3415	4332	3435	11891	9356a	6533	11893	11689	3611
Pr. Mx.—B.O. condyle		225	200	—	200	—	—	—	—	—
Pr. Mx.—Post. Sq. edge		240	218	—	215	255	222?	213?	235	—
Pr. Mx.—Ant. Orb. border		115	110	90	113	117	106	108?	118	97
Pr. Mx.—Pin. For.		165	155	—	160	—	158	—	177?	148
Width of Snout over Canines		50	47	—	55	52?	45	50	52	45
Width of Snout over last P.C.		55	60	—	60	—	52	57	—	59
Width Interorbital		33	35	—	30	—	25 ?	—	30	28
Width Intertemporal over Pin. For. ..		20	—	—	16	—	14	—	17	25
Height of Snout at Post. edge of Canine ..		40	45	40	39	53?	40	51	37?	40
Height at P. Orb. bar		25?	30	—	20	—	—	—	30?	30?
Length of Upper Incisor Series ..	l.	32	33	—	—	35	30?	35	30	35
	r.	32	—	30	35	—	—	34	—	35
Diastema C.—I.	l.	11	8	5	—	9	9	13	9	10
	r.	11	11	6	5	—	—	13	—	9
Diastema C.—P.C.	l.	8	15	12	15	16	10	11	12	10
	r.	11	11	9	14	10	10	10	11	8
Length of P.C. series	l.	28	30	22	26	27	27	—	—	25
	r.	29	—	27	27	25?	35	—	33?	21
Ant.-Post. Diam. of Canine	l.	12	10	10	11	12	13	12	12	5
	r.	11	10	9	7	12	12	12	11	6

Genus *Maraisaurus* Boonstra.

Boonstra, 1953, p. 62. Genotype. *M. parvus* Boonstra.

DIAGNOSIS

Small Pristerognathids with dental formula unknown but probably i.6?, c.1?, p.c.4?

Skull very small [Max. Length (as reconstructed) 162? mm.]; preorbital depression very deep with sharp rim; frontal with moderate entry into orbital border; postfrontal well developed; orbits large and just entering anterior half of skull. Sagittal crest of parietals fairly low, but with sharp edge.

Maraisaurus parvus Boonstra (Fig. 21).

Genotype. S.A.M. 11944. Buffelsvlei, Beaufort West. Coll. Marais.

The posterior two thirds of a somewhat weathered skull lacking the snout.

Lateral view (Fig. 21*b*). The articulatory region of the lower jaw has recently been figured and described (Boonstra, 1953, p. 62). The prefrontal has a sharp dorsal edge separating a small lateral from a larger dorsal face. The jugal is well developed with an anterior ramus forming the stout suborbital bar; a weaker dorsal ramus forming the lower half of the orbital bar and a fairly long posterior ramus, overlain by an anterior ramus of the squamosal, forming the anterior and much of the ventral part of the lower temporal arch. The postorbital is small forming only a small part of the orbital margin and posteriorly extending as a weak tongue on to the lateral face of the parietal.

The squamosal has a moderate descending flange carrying the quadrate complex but not extending far ventrally so that the quadratic condyle still lies well above the level of the lower border of the dentary.

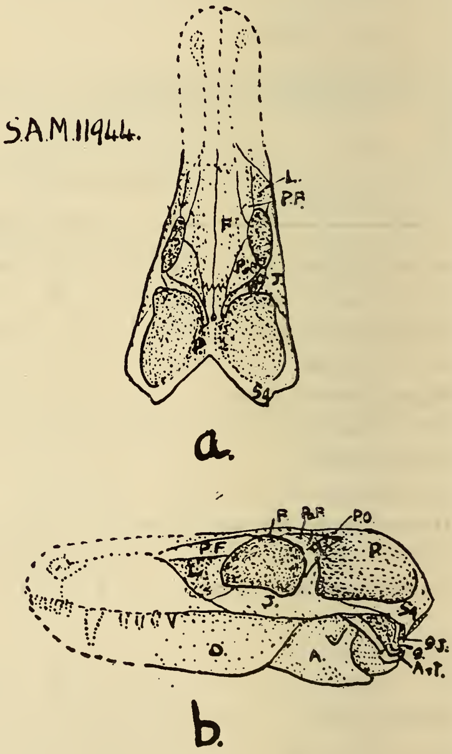

FIG. 21.—*Maraisaurus parvus*. Type. S.A.M. 11944. (× ⅓.) *a*, Dorsal view. *b*, Lateral view.

In dorsal view (Fig. 21*a*) it is seen that the temporal fossa is fairly long and wide, the intertemporal region narrow and the sagittal crest low but sharp. The frontal is long and has a fairly large entry into the orbital border; the postfrontal is well developed; the postorbital has only a small entry into the orbital border and its posterior tongue weak and flanks the parietal for only a short distance; the ridge on the prefrontal sharply separates the dorsal from the lateral surface.

An Unidentified Pristerognathid.

S.A.M. 11959 (Fig. 22). Dikbome, Laingsburg. Coll. Boonstra.

Fragmentary weathered skull pieces.

The dental formula is i.6, c.1, p.c.5. The incisors are robust, with the 6th strong, occupying 40 mm. on the left and 43 mm. on the right side. There is no diastema between incisors and canine and the diastema between canine and postcanines is very small (5 mm. on the right and 6 mm. on the left side). The postcanines are irregular with the first, fourth and fifth fairly weak but the third quite robust and occupying 36 mm. on the left and 45 mm. on the right side. The articulatory region has recently been described (Boonstra, 1953).

This form appears to occupy a position intermediate between genera like *Scymnosaurus* and *Cynariognathus*.

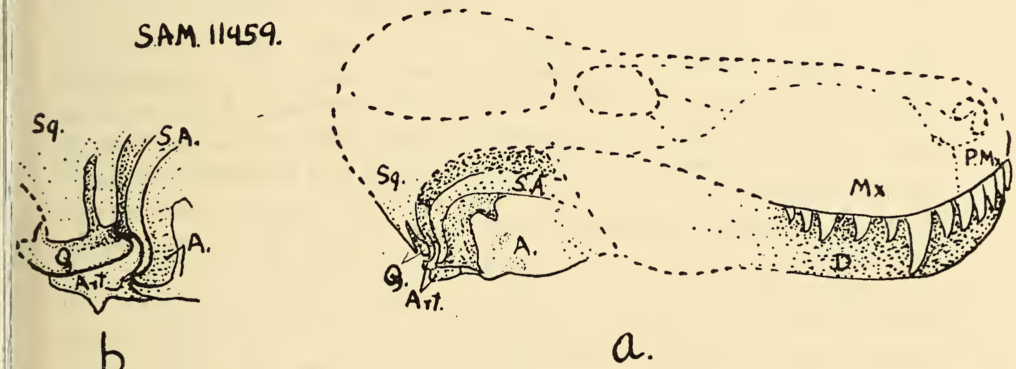

FIG. 22.—*An Unidentified Pristerognathid.* S.A.M. 11959 *a,* Lateral view ($\times \frac{1}{3}$.) *b,* Oblique view of the articular region. ($\times \frac{2}{3}$.) The quadratojugal is not preserved; when present it rested on the ledge on the posterior surface of the quadrate.

DISCUSSION

As all recent authors derive the Therapsids from the Pelycosaurs it will be of interest to compare the Pristerognathidae — the most primitive Therocephalian family — with the Pelycosaurs. From Romer's monograph I have extracted a list of morphological features mentioned by him and am comparing the same structures as identified in the Pristerognathids.

The Pristerognathids agree with the Pelycosaurs: in most forms the frontal enters the supraorbital border, but in some this entry is small and in some the frontal is secondarily excluded; a ridge separates a dorsal from a lateral surface in the prefrontal, but the general dorsal surface is not sharply separated from the lateral surface; otic notch closed at junction of squamosal and tabular; step anterior to canine as in predaceous Pelycosaurs; quadrate situated below plane of maxillary teeth; maxilla with its large canine crowds out lacrimal to form a junction with the nasal as in the advanced Pelycosaurs; squamosal covers most of posterior face of the quadrate; choanae well forward; expansion of posterior end of prevomer; quadrate ramus of pterygoid reaching quadrate; epipterygoid narrow, but not a typical *columella cranii* and reaches parietal; quadrate in contact with paroccipital; angular notch as in Sphenacodontidae.

The Pristerognathids differ from the Pelycosaurs: the parietal separates the postorbital from the squamosal; there is no basal movable articulation; the palate is not Rhynchocephalian-like; supratemporal absent; dorsal surface not sharply demarcated from lateral surface and sides not steep; premaxilla not extending posteriorly between nasals; parietal short but narrow; upper edge of occiput not moved forward and occiput is thus not slanting and the surface of the interparietal and tabular are not visible in dorsal view; condyle and quadrates not in posterior position; lacrimal always with little anterior extent; the postorbital bar is always slender, never developed as a plate of bone between orbit and temporal fossa; maxilla never meets quadratojugal; jugal though extending far posteriorly never meets the quadratojugal; quadratojugal always very small; septomaxilla with large facial exposure; only the anterior ramus of the pterygoid bearing teeth and no teeth on the lateral pterygoidal flange nor any on the palatine and ectopterygoid; lateral pterygoid flange never meeting the jugal; suborbital vacuity always present and large; epipterygoid somewhat broader and reaching the parietal; angular notch present and dentary always with a strong coronoid process.

It will furthermore be of interest to note in what characters the Pristerognathids agree with the Cynodonts viz. dentary with large coronoid process; sloping mentum; interparietal region narrow and sagittal crest; postorbital does not meet squamosal; preparietal absent; posterior end of prevomer spatulate and underlying palatines and pterygoids; jugal stretching far posteriorly ventral to the anterior ramus of the overlying squamosal; frontal sometimes excluded from orbital border as in Cynodonts.

REFERENCES

Boonstra, L. D. 1934. A Contribution to the Morphology of the Mammal-like Reptiles of the Suborder Therocephalia. Ann. S. Afr. Mus. XXXI, pp. 215-267.

Boonstra, L. D. 1935. On Some South African Reptiles of the Suborder Therocephalia preserved in the American Museum of Natural History. Am. Mus. Nov. 771, pp. 1-12.

Boonstra, L. D. 1953. The Lower Jaw Articulatory Region in some Pristerognathid Therocephalians. Ann. S. Afr. Mus. XLII, 1, pp. 54-63.

BROOM, R. 1903. On Some New Primitive Theriodonts in the South African Museum. Ann. S. Afr. Mus. IV, pp. 147-158.

BROOM, R. 1904. On Two New Therocephalian Reptiles (*Glanosuchus macrops* and *Pristerognathus baini*). Trans. S. Afr. Phil. Soc. 15, pp. 85-88.

BROOM, R. 1915. On Some New Carnivorous Therapsids in the Collection of the British Museum. Proc. Zool. Soc., pp. 163-173.

BROOM, R. 1915. Permian, Triassic and Jurassic Reptiles of South Africa. Bull. Am. Mus. Nat. Hist. XXV, II, pp. 105-164.

BROOM, R. 1925. On some Carnivorous Therapsida. Rec. Alb. Mus. III, pp. 309-326.

BROOM, R. 1931. Notices of some new Genera and Species of Karroo Fossil Reptiles. Rec. Alb. Mus. IV, pp. 161-166.

HAUGHTON, S. H. 1918. Some New Carnivorous Therapsida, with Notes upon the Brain-Case in Certain Species. Ann. S. Afr. Mus. XII, p. 175-216.

SEELEY, H. G. 1895. On the Therosuchia. Phil. Trans. Roy. Soc. 185, pp. 987-1018.